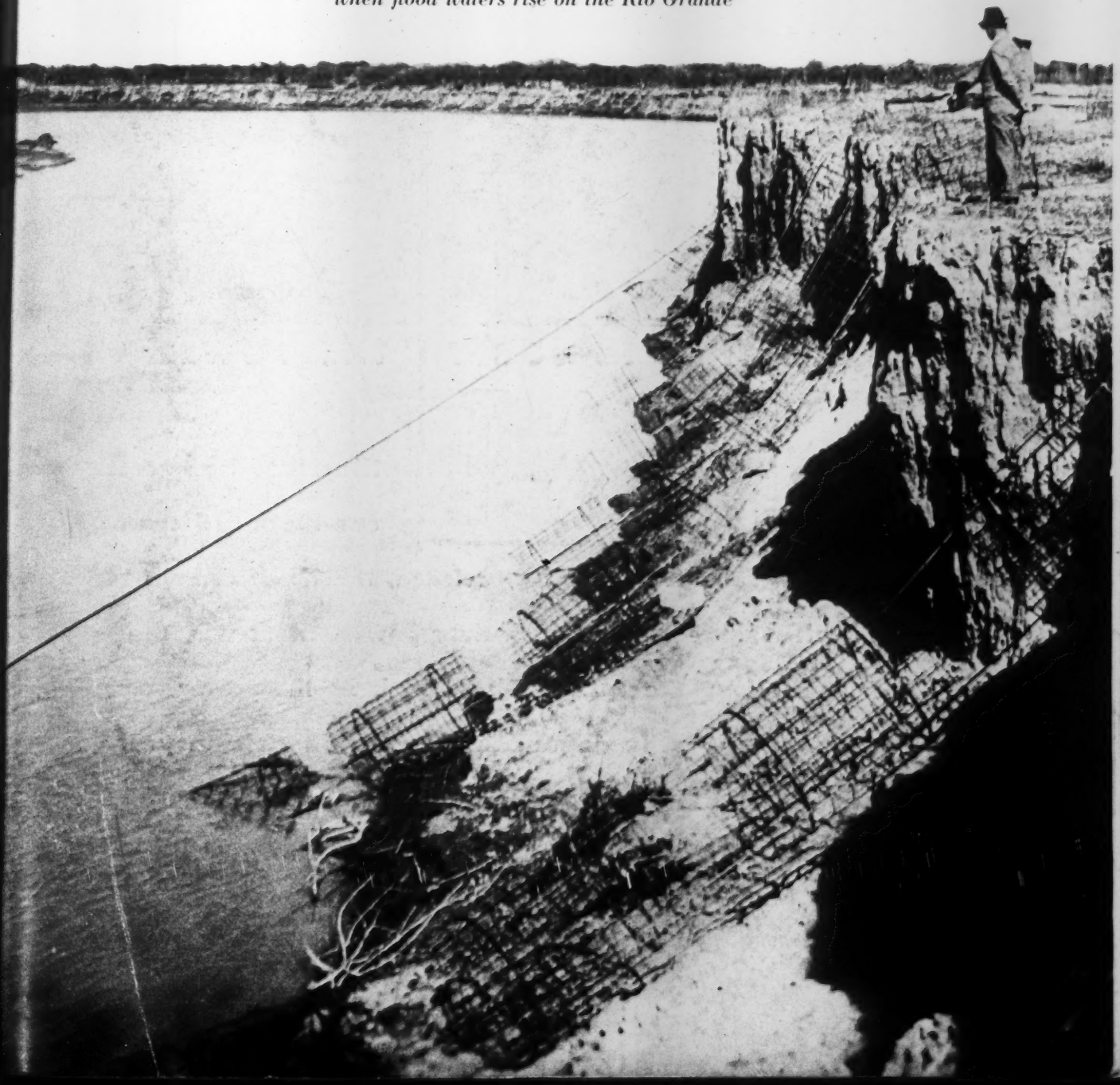
Engineering News-Record

McGraw-Hill Publishing Company, Inc. March 19, 1936 Twenty-five Cents, Five Dollars per Year

Cylinders of wire-mesh entrap debris and retard erosion when flood waters rise on the Rio Grande



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CONSTRUCTION STABILITY: A Problem in Finance

MORE and more the newspaper headlines reveal a widespread recognition that the major problems of the construction industry must be solved in the domain of finance rather than within the industry itself.

This does not imply that in either organization or technique the industry itself has achieved perfection. On both these counts much improvement is possible. Despite the remarkable efficiency now attainable in certain basic operations such as earth moving, concrete handling and paving, other departments of building practice offer fertile fields for the same kind of inventive genius and operating resourcefulness. Then, too, many aspects of marketing and administering construction service offer opportunities for a superior grade of organizing ability.

But even though all these internal conditions were well in hand, the truth still would face us that unsound, obsolete and predatory financial practice can so sicken the entire process of capital digestion that the best efforts of the construction industry to improve its own lot must be sterile.

SPEAKING for building construction especially, Rolland J. Hamilton, president of the American Radiator Company, recently put the matter quite bluntly. He reviewed the evils of inadequate housing, the destructive effect of periodic building booms, the failure to realize the consistent improvement in quality and decrease in price that is typical of other industries, our extraordinary inability to maintain housing standards on a plane comparable with the other functions of American living, in short, our failure to provide the great mass of American population with better homes at a price they are able to afford. Then he records his conviction "that the answer lies in the realm of finance."

It is probable, of course, that a contributory factor of considerable importance is our entire concept of land tenure and taxation but reform in this respect is likely to be so gradual as to promise scant relief without an upheaval of widely accepted ideas. Meanwhile Mr. Hamilton's answer offers the next feasible step; in financial practice we find an opportunity to overhaul and check against modern conditions many ideas that we now take for granted.

Here is no place to review his thesis in detail. But he traces to high interest rates, excessive financing charges and loose financing generally the source of many evils, such as disproportionate building costs, poor construction and the extravagant booms that inevitably breed those destructive collapses with which we all are so familiar. More reasonable financing costs, more consistent amortization, more secure terms for building loans: all these offer opportunities to achieve greater stability in home building and to put it on an investment rather than a speculative basis.

"This is the only advanced nation," says Mr. Hamilton, "where building loans are made on the basis of short terms and without amortization. * * * Securities issued on the homes of the people of other countries have for generations borne low interest rates and have ranked second only to obligations of the government."

The case that Mr. Hamilton makes for home building might well be pondered by the entire construction industry. Financial practice in many departments of industrial and utility construction suffers from some of the same ills and offers opportunities for the same remedies.

Without the steady flow of capital into new facilities of production and service we can have no uniformity of demand for the services of the construction industry; without more effective curbs on the speculative misuse of the financing function we can have no such steady flow. No single group of our people, not even the investors themselves, has a greater stake in sound financing practice than has the construction industry, so dependent for its existence on the sustained flow of capital into fixed wealth.

TODAY we may take heart from the increasing attention now accorded to it; but if good is to come of it all we shall need a progressive and realistic attitude toward the subject rather than work merely for the survival of practices that heretofore have been responsible for widespread havoc.

Willard Chevalier

ENGINEERING NEWS-RECORD Published every Thursday. Vol. 116, No. 12. Price 25c. per copy. Subscription, domestic, Canada, Mexico, Central and South American countries, $5 per year. All other countries $9 a year or 36 shillings. Entered as second-class matter April 11, 1917, at the Post Office at New York, N. Y., under the Act of March 3, 1879. Printed in U.S.A. Cable Address "McGrawhill, New York." Member A.B.P. Member A.B.C.

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Editorial and Publishing Offices: 330 West 42d St., New York; 520 N. Michigan Ave., Chicago; 883 Mission St., San Francisco; Aldwych House, London, W.C. 2, England.
Branch Offices: Washington; Philadelphia; Cleveland; Detroit; St. Louis; Boston; Atlanta, Ga.

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Calling on the increasing resources of soils mechanics, the engineers of the Muskingum flood-control works have extended the boundaries of rational design of earth dams to new horizons, surveyed in a series of four articles beginning next week.

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March 19, 1936

FIG. 1—DROP STRUCTURE where a line of four siphons passes under the floodway near Mercedes.

Flood-Control Work in the Rio Grande Delta

Restriction of the main river channel in the delta region makes floodways necessary—International Boundary Commission cooperates with the counties in levee and floodway construction

THE ENTIRE VALLEY AREA on the Lower Rio Grande both in Mexico and in the United States has experienced severe floods, of which those in 1903, 1904, 1909, 1913, 1922, 1923, 1925 and 1932 were of great volume and destructive proportions. In the flood of 1922 and in other major floods, water spread out in places as much as 40 miles from the river. The great length of the Rio Grande and the widely varying conditions of different parts of the watershed result in a very irregular runoff and discharge. Near the coast the watershed is subject to hurricane-type rains which occur during the summer and early autumn. Extraordinary precipitation can be expected to produce flood conditions on tributaries in the United States and in Mexico 300 miles above the lower delta country, and this creates menacing flood conditions in the main canyon section of the Big Bend district.

The first unit of a complete coordinated international flood-control plan covering river levees and floodways was presented to the Department of State in December, 1931. In August of 1932 there was experienced at Brownsville, Texas, and Matamoros, Mexico, a serious water shortage. This condition was followed in September, one month later, by the largest recorded flood discharge. This flood was a result of extraordinary rainfall in the drainage area of the Devils and Pecos Rivers discharging into the main Rio Grande below the canyon section of the river and proving the necessity for the construction of lower river levees and floodways to discharge properly the accumulation of floodflows reaching the river below possible storage dams.

The commissioners representing Mexico and the United States joined in a report on Sept. 3, 1932, which outlined the general plan for the first unit of flood control confined to the delta district and recommended a proration of floodflows between the two countries; while agreeing on certain benefits to be derived from upper river storage, they concurred in the statement that such works would not eliminate the necessity for lower river protection as proposed.

The recurring shortages of water supply and floodflows are, of course, definite evidences and symptoms of an uncontrolled river, and future plans now being studied and investigated by the two engineering sections of the International Boundary Commission are expected to include storage works to conserve properly and put to useful purposes the present unregulated supply from upper river sources. The cost of the completed work is given in Table I.

Involved in these plans for control of the floods in the Lower Rio Grande Valley are an unusual number of factors not ordinarily encountered. Floodways utilizing old river channels to divert water from the present river at the upper end of the more or less fan-shaped delta are the principal means of caring for the 200,000-sec.-ft. probable flood expected. It is necessary to take the water out of the upper reaches, since the river diminishes rapidly in capacity as it nears its Gulf outlet.

On the American side the International Boundary Commission has recently completed an expenditure of $2,000,000 in the rehabilitation of existing floodway structures and levees, in the construction of one new headgate control, in clearing floodways and in rebuilding river levees. Additional work estimated at nearly $5,000,000 still awaits funds, but probably a major flood somewhat less than the above noted 200,000-sec.-ft. could be withstood. The Brownsville 17-mile ship channel, bringing Gulf level within 6 or 7 miles of the city, is complete. Flow into the ship channel from a broken levee would be serious in silting it up. Since the maximum flood elevation at Brownsville to date is 37.7 ft. above Gulf level, maintenance of the river levees is doubly important. On the Mexican side a river levee about the same height as that on the American side is being constructed for a distance of about 28 miles above Matamoros, which is the Mexican city opposite Brownsville. A fund of 2,000,000 pesos is available for this work. Channels from the levees to a floodway 5 or 6 miles back from the river are contemplated. It is obvious that the openings in the levees leading to these channels must be kept free if river levels during floods are not to be greatly increased.

A fund of 5,000,000 pesos is said to be available for an early start on a 140-ft. dam at El Azucar on the San Juan River, one of the two principal rivers entering from the south causing floods. This dam will help control floods.

Probably the most serious factor is the development of these works without any definite treaty with Mexico as to the division of the water in the Rio Grande for irrigation use. Thence come problems of water rights, both riparian and prior-use, practically not adjudicated. Riparian rights, which are said to come down from Spanish grants, are generally considered to apply only to the normal flow, while the prior-use theory is held to be valid only for floodwaters. As in practically every other old irrigated country, however, water appropriations exceed the available supply without storage. Storage on the Rio Grande is impossible under the 1848 treaty, which prohibits any obstruction in the streambed such as a dam. Such storage would help flood control. Treaty negotiations wait on definite official determination of quantities needed and where this water is to be used.

Knowledge of quantities of floodwater to be cared for is based on records dating back only a third of a century. The figures given below are for flows measured at the head of the delta near Closner or Penitas, 182 river miles (or about 80 miles in a direct line) upstream from the mouth of the river. Since, like all rivers that overflow onto a delta flood plain, the Rio Grande has made its own wide levees sloping to a lower back country, its channel capacity decreases rapidly as one goes downstream from the head of the delta, until opposite Brownsville 30,000 sec.-ft. is all the river will carry. The present program is based on a maximum flood of 160,000 sec.-ft. (experienced in 1909) augmented by a 25 per cent safety factor; although in 1932 a flood of 198,750-sec.-ft. at Rio Grande City was experienced, such a flood is considered to be probable only once in 50 years.

The river gets out of its channel when it reaches 35,000-sec.-ft. at Brownsville and 60,000 to 70,000-sec.-ft.- at Penitas, escaping at the head of the delta down an old riverbed, Sardinas Resaca, on the American side. At the maximum expected discharge of 200,000-sec.-ft. 60 per cent of the flow, or 120,000-sec.-ft., would enter this old Sardinas channel. Accordingly this channel has been converted into the main floodway by building levees on high ground some 3,800 ft. apart. West of Mercedes its flow divides, 60,000-sec.-ft. passing to the Arroyo Colorado and 60,000-sec.-ft. to the North Floodway, which follows an indistinct old riverbed now flanked by levees through Lake Campacuas to a point north of Sebastian, thence to marshlands bordering on Laguna Madre. At maximum flow 5,000-sec.-ft. is to be diverted from the river into Rancho Viejo, another old riverbed made usable by levees. Thus there is left 75,000-sec.-ft., of which 30,000 is to go by Brownsville in the regular channel and 45,000 is to escape on the Mexican side.

In September, 1932, a definite agree-

TABLE I—ESTIMATE OF COST OF COMPLETED FLOOD-CONTROL PROJECT

Feature	Estimated Cost
Rio Grande levees	$626,983
Rancho Viejo Floodway	30,561
North Floodway	1,913,702
Arroyo Colorado Floodway	91,462
Main Floodway	847,111
Miscellaneous construction	170,320
Total of construction items	$3,680,139
Maintenance during flood	100,000
Maintenance during construction	75,000
Aerial surveys	8,000
	$3,863,139
Contingencies, 7 per cent	270,420
	$4,133,559
Right-of-way negotiations	82,671
Hydrographic work	12,401
Engineering and inspection, 7 per cent	289,349
Superintendence and accounts, 4 per cent	165,342
General expense, 5 per cent	206,678
Estimated total to complete project	$4,890,000
Present allotment (practically all of which is expended)	2,000,000
Total estimated cost of project	$6,890,000

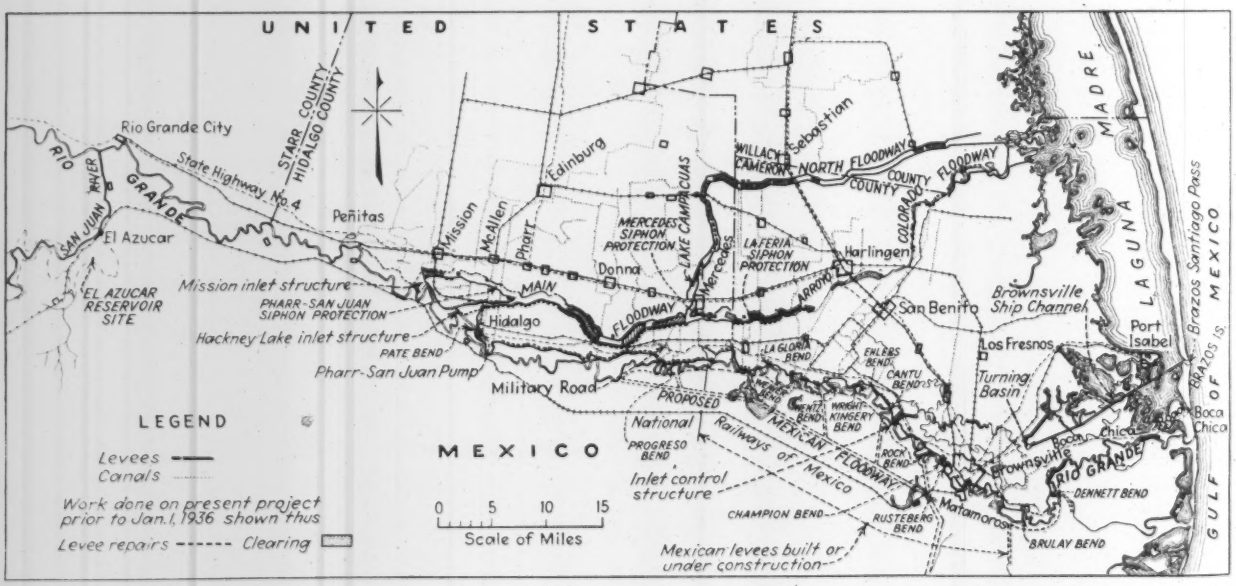


FIG. 2—LOWER RIO GRANDE flood-control project, showing work done by International Boundary Commission on levee repairs, protection of siphons carrying irrigation water under floodways and river bank protection at thirteen bends. The location shown for the Mexican levees and proposed floodways is only approximate.

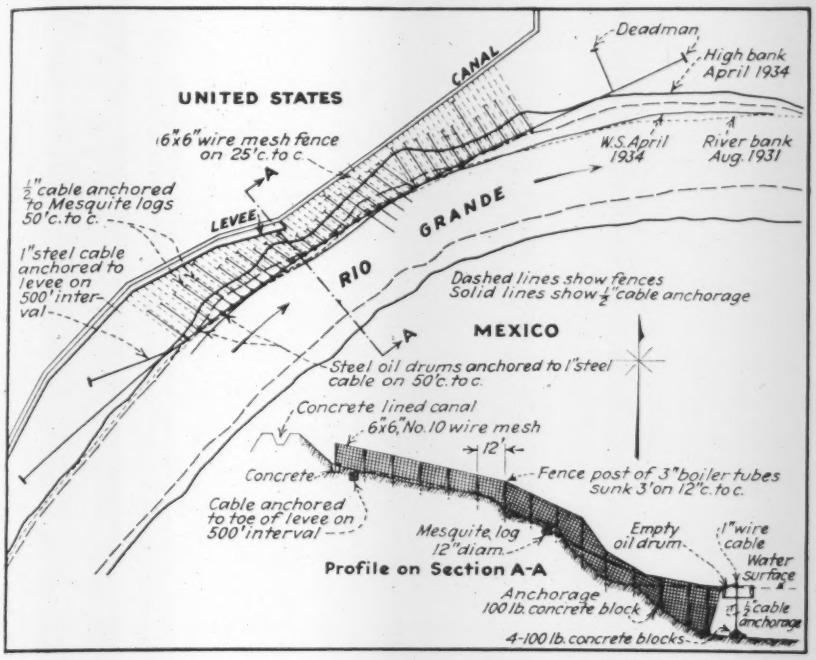

Deadman
High bank April 1934
CANAL
UNITED STATES
16"x6" wire mesh fence on 25'c. to c.
W.S. April 1934
River bank Aug. 1931
½" cable anchored to Mesquite logs 50'c. to c.
LEVEE
GRANDE
1" steel cable anchored to levee on 500' interval
RIO
Dashed lines show fences
Solid lines show ½" cable anchorage
MEXICO
Steel oil drums anchored to 1" steel cable on 50'c. to c.
Concrete lined canal
6"x6" No. 10 wire mesh
12'
Concrete
Fence post of 3" boiler tubes sunk 3' on 12"c. to c.
Cable anchored to toe of levee on 500' interval
Mesquite log 12" diam.
Empty oil drum
1" wire cable
Water surface
Profile on Section A-A
Anchorage 100 lb. concrete block
½" cable anchorage
4-100 lb. concrete blocks

FIG. 3—CAVING OF THE BANK at Progreso Bend was halted by use of wire-mesh velocity retarders strung on bridles extending out to a cable stretched as a chord across the bend.

ment was reached between the boundary commissioners of the United States and of Mexico as to the amount of flood-waters that would be handled in the respective countries through auxiliary channels and in the main river at Brownsville. The agreed quantities are given in Table II.

In view of the fact that such an agreement has been reached, except for the Donna diversion, it becomes the obligation of the United States to undertake to carry the agreed amounts, and the work that has been completed and that is contemplated for the future is based in general upon passing these stated quantities through the floodways.

Topography of the region

Below Rio Grande City the river runs through alluvial bottomlands, where its course changes frequently. Concave banks are constantly eroded. Cutoffs are numerous. Old courses, called *resacas* (Spanish contraction of *rio seco*, dry river), such as Arroyo Colorado, Sardinas and Fresnos, are mostly on the north side and extend 2 to 8 miles back from the river. The river banks are nearly vertical, 12 to 30 ft. high. Grades of the normal water surface between Rio Grande City and Brownsville average 0.65 ft. per mile, ranging from 0.4 to 1.0 ft. High water without protection would flood all of the first bench lands west of Mercedes and large areas to the east, nearly 350,000 acres. Natural drainage is through the arroyos, but many of these are used as canals or have been dammed to provide storage and desilting reservoirs from which water is pumped to the land in elevated canals. Other obstructions, such as roads, canals, drains and dikes that lead from the river out across the valley, make a series of ponds when water escapes into them from breached levees. Roughly, 500,000 acres of irrigable land are under canal, and it is considered possible that another 500,000 acres may sometime be covered.

Irrigation

How much water is available for irrigation cannot be accurately determined, but it is estimated that full control of the flow will provide for 1,000,000 acres. With the Salado River dammed at Don Martin and the San Juan River soon to be dammed at El Azucar, 15 miles south of Rio Grande City, 55 per cent of the runoff of these rivers will be controlled, and they are the worst offenders in producing valley floods. But this storage capacity, especially since it is to be used for other than flood control, is not great enough to eliminate the necessity for floodways and levees.

Costs and benefits

The several counties involved have acted individually in the past and have built only the more obviously needed portions of the flood-control elements. Hidalgo County spent in original cost, exclusive of interest, $4,832,000, and Cameron County spent about $1,700,000. The depression prevented further expenditures. Then the Public Works Administration allotted $2,000,000 to the International Boundary Commission for maintenance, repair and the more essential new work.

Up to that time all work had been done with common labor at 10 to 15c. an hour, but when PWA came in its 40c. minimum wage rate had to be applied. Estimates should be read with this increase in mind. Some of the early work, mainly because of lack of funds, was not carried out as carefully as it might have been; hence heavy deferred maintenance has piled up. In 1932 and again in 1933, floods caused much caving in the bends of the river. At a dozen places loss of levees was imminent. This danger, together with extensive deferred maintenance, called for large expenditures if the valley was to be kept out of water.

With the $2,000,000 available, the International Boundary Commission built up its valley office to a staff of 100 and proceeded to let contracts for the major work while doing the less definite work by force account. Following the 1933 hurricane, with its 120-mile wind velocity, the engineers of the U. S. Army came in and spent upward of $100,000 in rehabilitation and repair work.

Floodway levees

The original levees, thrown up by draglines, were loosely built and not shaped up, due to lack of funds. It was impossible to traverse them for repair during high water. They were supposed to have an 8-ft. top width, ditched to permit puddling, but were not always so built. Side slopes were intended to be 2:1 on both land and water faces. Borrowpits were on the outside, so that they could be used as drainage ditches, but often they were not connected to outlets.

Repair of these leaves involved cutting off the irregular top and adding enough material from inside pits for a 15-ft. top and a 3:1 inside slope, keeping the outside 2:1. It was found that the old levee material in many of the gumbo areas had never been compacted. In other places the low floods had consolidated the lower base material and

TABLE II—ALLOCATION OF LOWER RIO GRANDE FLOODWATERS

Flood Discharge, Sec.-Ft.	Main River Below Brownsville	Main River Below Rancho Viejo	Rancho Viejo Floodway	Main River Donna to Rancho Viejo	Donna Floodway (American)	Donna Floodway (Mexican)	Main River, Mission to Donna	Mission Floodway (American)
30,000	30,000	30,000	0	30,000	0	0	30,000	0
30,000 to 35,000	30,000	30,000	5,000	35,000	0	0	35,000	0
35,000 to 60,000	30,000	30,000	5,000	35,000	25,000*	25,000	60,000	0
60,000 to 80,000	30,000	30,000	5,000	35,000	45,000*	45,000*	80,000	0
80,000 to 140,000	30,000	30,000	5,000	35,000	45,000*	45,000*	80,000	60,000
40,000 to 187,000	30,000	30,000	5,000	35,000	0	45,000*	80,000	107,000

*Water may be passed either way as agreed by the International Boundary Commission.

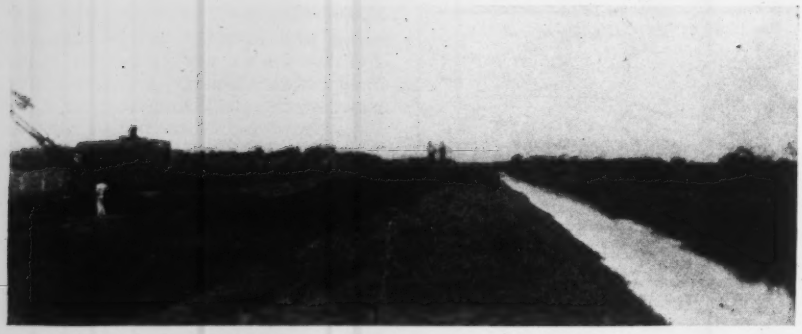


FIG. 4—NEW MATERIAL has been added to the old levees to bring them up to a 15-ft. top width and a slope of 3 to 1 on the river face. This shows the levee west of Pharr Road.

FIG. 5—A JETTING CREW at work consolidating the new levee in Hidalgo County.

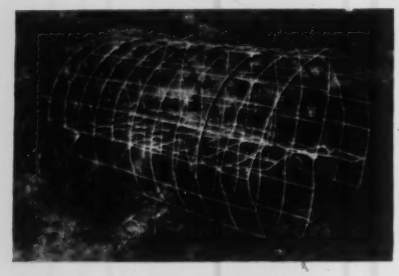


FIG. 6—RETARD CYLINDERS are made of 6x6-in. 10-gage mesh around ½-in. hoops of reinforcing bars welded at the ends. The partitions stiffen the frame and make a fastening for the ½-in. cable on which the cylinders are strung.

the top had arched over, leaving moon-shaped craters, which served as nests for owls, snakes and rodents. A trench, therefore, was dug in the crown of all new levees and water pumped in. In the lower levees, 6 to 8 ft. high, poles were used to make holes in the trench bottom to let the water get down into the levee. In the higher levees jetting under pressure was done, some 890 stations, 6 ft. apart, being occupied. To care for the shrinkage, the levees were built up 30 per cent above grade. After jetting, the levees were reshaped but still were left 10 per cent above grade to allow for future settlement.

Bermuda-grass tufts were placed at 4-ft. intervals over the finished grades, a total of 546,000 sq.yd. This grassing took root well on 3:1 slopes and cattle grazed over it, but the 2:1 slopes were found to be too steep for early successful growth; the bank washes badly, and it is too steep for the cattle.

Much of the original clearing in the floodways had been done by cutting brush only to the ground surface. Great clumps grew up from these roots. Under the new program the roots were cut off a foot or more below ground surface. A heavy (7,000-lb.) plow with five 26-in. disks, drawn by a 60-hp. tractor, cut a 40-in. swath and turned up roots from 13 in. and deeper, which were picked out by hand and burned. Mesquite, if fired at once, burns readily, due to its oil and waxy leaves, while if left it must dry several weeks before it will again burn as easily. After clearing and plowing, farmers were encouraged to crop the floodway area or to use it for pasture. After two or three years of cultivation wild brush ceases to grow. In all, 9,300 acres were cleared.

Bank protection

At thirteen places the river bank had been eroded on the outside of bends so close to levees that emergency measures were necessary in the last two floods.

FIG. 7—CONTROL WORKS consisting of seven 4x16-ft. tainter gates permit flows up to 5,000 sec.-ft. to enter the Rancho Viejo floodway.

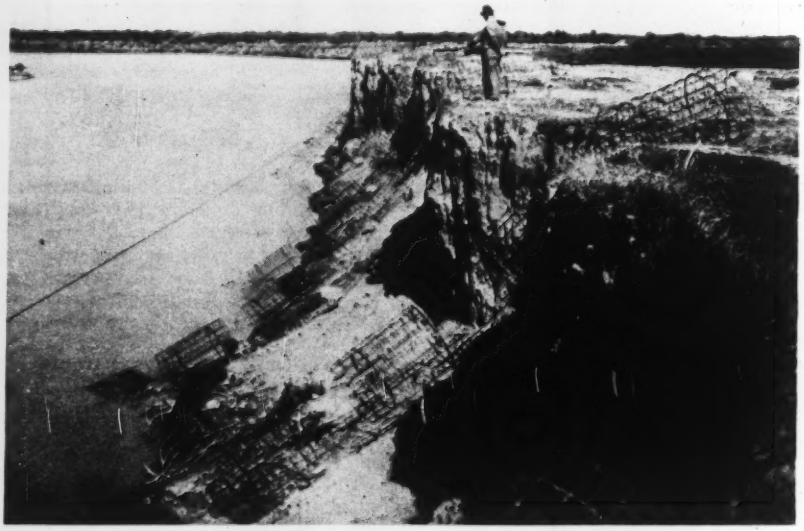


FIG. 8—WIRE-MESH CYLINDERS have been thrown over the steep cutting bank at Pate Bend to check erosion. They are held down by concrete anchors.

In this work novel wire retarders made with cables and woven wire and cylinders of wire now are used as velocity retarders to entrap debris and drop silt.

The sketch (Fig. 3) shows the manner of placing long cables as chords across a river bend, anchoring them with two deadmen at the end of each cable. The cables are kept afloat with oil drums. After swinging the chords into position, ½-in. bridles are attached at 25-ft .intervals, and on these small cross-cables or bridles are hung fences of 6x6-in. mesh of 10-gage wire. The bridles extended back to deadmen, a minimum of 50 ft. from the bank, often to the levee base. On land, posts are used to support the fence, and the bottom fence wire is buried 4 in. to prevent undercutting. In water, the wire is hung vertical with 100-lb. concrete blocks, bringing the bottom of the fence to rest on the riverbed.

When the river is already well up and cutting fast, wire-mesh cylinders are used as an emergency installation. These are 5 ft. long and 3 ft. in diameter, with the mesh wrapped around two ⅝-in. reinforcing steel hoops welded at the ends. A cross-partition of mesh makes a center fastening for a ½-in. cable on which the cylinders are strung and secured. Strings of these cylinders are let down over a caving bank to a 1¼-in. wire cable placed on the chord of the bend and weighted as were the fences. In emergencies it is not always possible to place the chord cable, and the weighted strings of cylinders were simply pulled out from the bank by boats and dropped.

While the result is an irregular mass of tangled wire and debris, several of the banks inspected recently had begun to build out under water. The far bank in the opposite end of the bend had started to wash, and on top of the bank, in the area covered with fences or cylinders, from 18 to 24 in. of silt had been deposited in a single flood.

The mesh retarders were devised in the boundary commission office and were built on the ground, but the cylinders were fabricated in the commission's shop. The advantage of the cylinders is that they may be built any time, stacked and transported easily to any point. Each unit can be carried by one man over soft ground and used wherever rock, trees or brush are not available.

Inlet controls

At the head of the Rancho Viejo is a reinforced-concrete headgate structure containing seven 4x16-ft. tainter gates. They are raised by wire cables and hand-operated geared winches. The entire foundation area is confined by a surrounding line of 20-ft. steel sheetpiles. Four cells are created by lines of cross-piling. French drains under the slabs lead to openings in the downstream apron. At first it was intended to put in concrete-block velocity retarders, but with the small amount of scouring experienced in the first passage of water only lengthening of the apron by another 70 ft. of slab is now contemplated as necessary. A small dam to prevent backing water into the upstream reaches of the resaca above the entrance of the floodway and a few levees are required before the full 5,000-sec.-ft. can safely be let out of the river.

As operated at present, the gates are opened to take a full 3,000-sec.-ft. and closed when the diversion can be dispensed with as silt deposits rapidly when less water is flowing through the floodway.

During floods an engineer is on duty at all times to note flood heights and to operate the gates to give the required flow. Similar structures are planned eventually for the entrance into the main floodway at the Mission and Hackney Lake inlets.

Siphon protection

At thirteen siphon and canal flume crossings, repairs of various kinds have been made. At the Mercedes crossing are four 7-ft. 9-in. reinforced-concrete inverted siphon conduits. The passage of 3,000-sec.-ft. down the floodway channel had scoured a hole 15 ft. deep on the downstream side of the conduits. To eliminate this scour, three concrete drops of 6, 7 and 7 ft. respectively were built in the center of the channel, 2,700 ft. between the first two and 500 ft. between the second and third. Sheetpiles were driven across the channel to the drops. The drop over the conduits consists of a 6-in. slab, 13 ft. wide at the downstream side of the conduits over which the water drops 5 ft. into a 5-ft. pool, 25 ft. wide and 400 ft. long. A line of sheetpiles was driven under the inlet and outlet weirs. The other two drops were of the box type, 4½ ft. deep and 47 ft. from upper to lower crests. The upper crest was covered around the side walls to cutoff walls so that the water entered on three sides. These boxes are designed to be drowned out when the flow exceeds 3,000-sec.-ft.

L. M. Lawson is American commissioner of the boundary commission at El Paso.

In charge of the Lower Rio Grande office of the International Boundary Commission at San Benito, Tex., is J. L. Lytel as project engineer. W. W. Hall and V. R. Brady were associate construction engineers, handling 800 men on contracts and as many as 1,200 men on force account. Being emergency work, it is done in close cooperation with Cameron and Hidalgo counties, for which W. O. Washington and H. P. Griffin (succeeding E. M. Card) are engineers, respectively. E. N. Noyes is consulting engineer for this project.

Base-Exchange Substances Found to Remove Metals from Drinking Water

INVESTIGATIONS carried on in Great Britain in connection with the base-exchange process of water softening have shown that base-exchange material can remove all traces of metals such as lead, copper, zinc and tin from water. The subject, summarized in the annual report of the Water Pollution Research Board, is of importance since considerable quantities of these metals may be present in drinking water under certain conditions.

An application of these results has been the development of a method for determining the true average concentration of lead in water drawn from a household service over a period of of weeks. In the past it has been usual only to determine probable extreme concentrations of lead in the water by the examination of small samples collected after the water had remained stagnant in the pipes overnight and after the water had been allowed to flow for some time. By the new method the drinking water withdrawn during several weeks is measured by means of a meter and is passed through base-exchange material contained in a small filter, which can conveniently be attached to the water tap. At the end of the period the material in the filter, which removes the whole of the lead from the water, is examined by chemical analysis.

Base-exchange materials in use for softening water include synthetic products and treated minerals. Some of these synthetic products are manufactured in Great Britain, but the minerals must be imported. As a result of the investigation, methods of treatment have now been devised whereby material suitable for softening water can be prepared from certain British clays. Some materials have been obtained which are equal in softening value to imported clays and are less liable to deterioration.

One outstanding discovery resulting from the board's work is that certain synthetic resins possess marked base-exchange properties, greater in some instances than those of existing commercial material. Other resins have been prepared which remove acid from solution in water. By treatment of tap water with a resin of one type and then with a resin of the second type, the salts in solution were reduced from 33 parts to about 1 part per 100,000. Similar treatment repeated two or three times removes most of the salt from sea water.

House Building Begins to Get Technical Attention

AN architect-banker partnership in the interest of better home building and financing is receiving the attention and endorsement of the American Institute of Architects and the Federal Home Loan Bank System. Based upon the familiar stock plan idea but supplemented by limited architectural service and field supervision, the plan has the particular merit of placing the lending institutions on the side of better design and construction. It also opens up a new field for architects and engineers and gives the home owner technical service at reasonable cost.

Washington Correspondence

RECENT announcements point to the entrance of the architects and the engineer into more active participation in the small-house field and to the bolstering of technical practices in this branch of construction activity. These developments to some extent are due to the depression with its resulting distress to home-owners. But more importantly they are a product of the concentration of effort on the housing field as a means of stimulating construction activity and hence the demand for durable goods as the essential prerequisite to full business recovery.

Operations under Title II of the National Housing Act within the past year have placed increasing emphasis upon the use of technical services in the small-house field. A recent pronouncement of the American Institute of Architects, and an evidence of interest by the Federal Home Loan Bank System in a proposed home-building service are occasions worthy of particular note. They indicate that methods employed in the small-house field are definitely in the process of evolution, and that the imminent new era of home building may feel the influence of new developments.

A.I.A. takes the initiative

The directors of the American Institute of Architects at a meeting in December, 1935, approved the proposal of its committee on housing to establish, through the assistance of the Institute's 67 chapters, local groups of architects prepared to furnish plans, specifications and supervision of construction in the small-house field in a manner to meet each local opportunity. This action, signalizing the entrance of the architects seriously into the small-house field, is recognition not only of the need for technical advisory and supervising services in the construction of the small house but of the opportunity for profitable employment for architects in this field. The latter is not an unimportant consideration at a time when activity is so limited in other construction fields. The inherent possibilities are set forth clearly in the following letter from the president of the Virginia Chapter, A.I.A., published in the October, 1935, *Octagon:*

> I am greatly interested in the Institute's attitude toward the design of small homes. . . . Several of this state's architects followed my suggestion and submitted sketches to their local lending institutions for the advancement of our federal housing program, and one architect alone reported that he sold one of his designs twelve times and, in addition, gained the good will of that lending institution to such an extent that he gained 24 additional commissions on larger constructions through them.

Members of the American Institute of Architects have previously endeavored to devise a way for architects to enter the small-house field on a limited basis that would provide somewhat reasonable compensation for their services. Several years ago much effort was concentrated on the Architect's Small House Service Bureau. The bureau produced a variety of small-house plans which were offered to home builders at modest fees. Activity was pronounced in several cities, including Minneapolis and Boston. Arrangements were made with architects in various cities as agents for the bureau to serve as distributing points for these plans and to offer supervisory service. Plans were also made available by various distributors of construction materials. Initially, the bureau activities had the endorsement of the Institute. Later this was withdrawn because of objection that the small-house plan service interfered with individual architectural service and that plans should not be offered without assurance of supervision over construction.

The Buffalo plan

Movements have developed in several cities recently to provide a limited architectural service in the small-house field. They have blossomed into such organizations as the Buffalo Small House Bureau and the Architectural Service Corporation of Maryland. While the details of the services offered differ somewhat, the basic thought is to provide the essentials of a complete architectural service. Standard or stock plans are used but are not sold without essential field service. This includes determination of the suitability of the selected design to the site and to the neighborhood, prequalifying of contractors, taking of competitive bids and a limited number of inspections during construction to determine performance with drawings and specifications. The Buffalo Small House Bureau offers such a limited service to the individual home builder on the following basis:

House Costing	
Under $4,000	$100
$4,000 to 5,000	110
5,000 to 5,500	115
5,500 to 6,000	120
6,000 to 6,500	125
6,500 to 7,000	140
7,000 to 7,500	150

Additional inspections will be made at a moderate fee as well as minor changes in drawings and specifications to suit individual desires. If the home builder desires radical changes in such standard plans or has individual requirements as to design which cannot be met by the standard plans, it is necessary that he arrange for the customary individual architectural service at the usual fees ranging from 6 to 10 per cent of the cost. Economy results from the use of standard plans which may be sold or used a number of times, thus spreading the design and drafting expense. A special service is also offered to operative builders who build to sell.

Government agencies interested

Since the small-house designs offered are developed by local architects, they are appropriate to the conditions in the community. This fact and the required advisory and supervisory service differentiate the Buffalo small-house architectural service from the many stock plan services available to the house builder.

The Institute's housing committee reports that the development of essential architectural service in the small-house field is of interest both to the Federal Housing Administration and to the Federal Home Loan Bank System. The insuring of mortgages on residential construction under Title II of the National Housing Act has indicated the need for more adequate technical service. Tentative commitment for such in-

surance is predicated on examination of drawings and specifications and final approval upon technical inspection during construction. Not only are individual home owners in need of a competent and impartial technical service to turn to when desiring to build a house, but operative builders frequently do not have the required technical organization. All sorts and varieties of house plans are freely offered to the home builder by builders, material dealers and others; but even when such plans are good, the home owner requires an advisory and supervisory service to be assured of sound construction.

Banker-architect cooperation

Quite a few member institutions of the Federal Home Loan Bank System for varying periods of time, and in one case for as long as thirteen years, have been offering technical advice and even construction service to home loan borrowers. That these instances have apparently aroused interest among other members is evidenced by a proposal for a home-building service plan set forth in a recent issue of the Federal Home Loan Bank Review. Member institutions have been asked to express judment on a proposal to equip the lending institution to offer complete technical services through cooperating architectural groups. The proposal cites the arrangements of the Buffalo Small House Bureau as embodying the essentials of the necessary technical service.

The Federal Home Loan Bank System is composed principally of building and loan and savings and loan associations, with a membership of about 3,500 institutions from among the 10,000 eligible lending institutions. Its members have gross assets of over $3,000,000,000, ranging from small institutions with a comparative few thousand dollars of assets to a few which run into many millions. Among the 3,500 members are about 1,000 Federal Savings and Loan Associations. The opinion is expressed that these lending institutions should equip themselves adequately to act as counselor to the home builder in the same manner that the commercial banker and investment banker endeavor to serve their respective fields. Further, the lending institution should be on the offensive, so to speak, to create desirable mortgage opportunities rather than be limited only to those that are brought to it; it is believed that the best way to offset poor design and shoddy construction is to point the way to appropriate design and sound construction. This requires that the lending institution be a party to the initiation of home-building projects and attract the home builder before he has contacted other sources which may be improperly equipped to give him sound advice and impartial and adequate technical services. Through local publicity it is proposed that the lending institution will be identified in the community as the headquarters for guidance on home construction; and that by virtue of the concrete assistance which it can give the home builder, the making of the required home loan will be the reward of the lending institution for its trouble. Keen competition for home-lending business, especially in view of the increasing use of the FHA insured mortgage, is cited as requiring the establishment of a home-building service. But the greatest advantage is that soundly constructed houses standing behind the mortgage loans will materially improve the mortgage risk.

The proposal states that the plan is not alone suitable to home construction by individual home owners but also by operative builders. It is felt that the reputable operative builder will be quick to realize the distinctive sales advantages of offering houses built under the Home Building Service Plan; that because of the trade mark created by the plan, such houses would earn the attention of the most discriminating buyers. By using the service, the operative builder would be assured of attractive architectural design and of technical advice and service at minimum cost, which would permit increased freedom in the development of his sales program. Furthermore, he would be able to make construction loans from the lending institution and establish a definite basis for a mortgage loan for the home buyer on the most advantageous terms.

Operation of the service

The principal steps in the operation of the proposed Home Building Service Plan are the following:

1. The lending institution carries on a promotional campaign to attract home builders.
2. The applicant is interviewed at the lending institution as to his housing requirements, and also as to his financial ability.
3. The applicant is assisted in the selection of an appropriate house design from sketch plans furnished by the architect associates.
4. The applicant applies for a mortgage loan and for architectural service with the cooperating service.
5. The lending institution determines the eligibility of the applicant for financing.
6. The lending institution appraises the building lot.
7. The architect inspects the lot and reports upon the suitability of the selected design to the site and neighborhood, and as to the practicability of placing the house on the lot.
8. Based on reports 5, 6 and 7, the lending institution passes on the mortgage application and makes tentative commitment.
9. The architect furnishes working drawings and specifications and invites contract proposals from a limited number of contractors, previously qualified.
10. The owner having accepted a contract proposal, the architect prepares the contract documents for signature.
11. The architect then follows through on supervision and inspection of the contract work and certifies as to payments due.
12. The lending institution prepares the loan documents for signature.
13. The lending institution makes payments on the contract on the architect's certification, arranges fire and other insurance for the owner, checks contractor's compliance with contract requirements as to liability insurance and bond (if required), and performs other functions as fiscal agent.
14. The construction being completed and accepted by the architect and approved by the owner, and liens having been waived or released, final payment is made to the contractor.

If the service is being furnished to an operative builder, the architect's service is modified accordingly. The lending institution would make a construction loan and subsequently deal with the purchaser for a regular mortgage loan.

Advantages claimed

According to those promoting the Buffalo plan, too great an emphasis in the small-house field is often put upon shoddy decorations, mechanical gadgets and flashy finish, and not enough on efficient plan, sound construction and finish requiring a minimum of expense for upkeep. Prior to the depression little thought was given to these basic requirements. So long as he was able to meet his payments, the owner failed to appreciate the real cause of high maintenance cost and low resale value. With lending agencies the situation was much the same. As long as payments were promptly made, there was no apparent reason to worry. The security behind the loan seldom was questioned. With the coming of the depression the picture changed. Soon it came to be realized that low resale values were not solely the result of existing economic conditions, but to an important degree were determined by poor design, inferior construction and improper materials. Now with a new era of home construction imminent, will the lessons of the past be heeded and will the mortgages which lending institutions are being urged to take be sound, or will they constitute additional undesirable risks? Will it be possible for either the lending institution or the government to liquidate such loans at their face value, should the mortgagor be unable to fulfill his obligations?

An industry problem

Qualified observers consider this a problem for the entire construction industry, not alone of mortgage-lending institutions. Far too high a proportion of small houses are built on a speculative basis with regard primarily for un-

loading them on home owners and lending institutions at exorbitant prices, and with unduly high margins to the speculator. Established branches of the construction industry, including builders and specialized and subcontracting groups, are wary of participation in this speculative program. The sharp issue between the construction industry code and the sponsors of the proposed land development and home builders' code (as a part of the real estate code group) is still fresh in the memory of the industry. Under the proposed home-building service plan, sound practices can be fostered and developed. The small builder would be benefited in competing on the basis of complete and definite drawings and specifications under qualified technical inspection. Special contractors and material and equipment distributors could participate profitably under a plan where adequate standards are established and assurance given of payment currently and completely. Material and equipment manufacturers, furthermore, have much to gain by the stabilizing of constr ction practices in the small-house field, since the most worthy products will fail if incorrectly used or improperly installed.

The situation in the small-house field today does not differ radically from that in certain other construction fields some years ago. Stablization and technical advance in these other fields have been brought about by concentration of the effort of the architect, engineer, builder, specialized contractor, material manufacturer and others. The same concentration of talent is badly needed in the small-house field. Without it, technical advancement will continue to be spotty, and small housing will continue to be mediocre and haphazard. The architect's entrance into the field and the home-building service plan are a commendable start toward the ultimate goal.

It is quite important to realize that while small houses in some localities are built to a considerable extent by individual home owners, in the large population centers they are produced more largely by operative builders. The average home buyer cannot visualize a house from drawings or sketches but prefers to see it as completed. In the modern merchandising market he buys all his products on this same basis. Hence it is necessary to introduce technical proficiency into operative building, and several suggested plans for large-scale operations deserve full consideration.

Mass production is being advanced chiefly from the standpoint of effecting economies in construction, but its advantages might be more pronounced in the direction of improved design and construction resulting from employment of adequate technical services, with due emphasis on basic subdivision planning and neighborhood protection.

Health Board Recommendations for Sewers and Treatment Plants

Illinois publication outlines acceptable standards to guide consulting engineers in submitting plans and specifications for proposed sewerage works

INSTRUCTIONS to engineers laying out sewers and designing sewage-treatment works to the end that plans and specifications will meet the approval of the Illinois State Sanitary Water Board have recently been published and issued by the Department of Public Health in cooperation with the sanitary water board. The recommendations were prepared by C. W. Klassen, acting chief sanitary engineer, Department of Public Health. The following notes are taken from the instructions, which outline good engineering practice in connection with preliminary reports on sewers and sewage-treatment plant design.

Items essential to be included in the preliminary report are as follows: (1) statement of the problem; (2) present and future area to be served; (3) present connected and design population data; (4) description of existing water and sewerage facilities; (5) present methods of garbage disposal and possibilities of future disposal with sewage; (6) character of sewage and flow studies, based on gagings; (7) character and volume of industrial wastes; (8) degree of treatment based on character of outlet stream and the policy of the state sanitary water board; (9) comparison of available sites and types of treatment; (10) basis of design of sewers and treatment units; (11) necessary maps and layout sketches; (12) estimate of construction costs; (13) estimates of operating costs; (14) comparisons of methods of financing; (15) engineers' recommendations.

Sewer design factors

For sewers no permit will be issued for combined sewers either for a new system or extension of an existing combined system. The load should be that anticipated 40 years hence and should be for at least 300 gal. per capita daily with additional allowance for industrial wastes. Watertight construction is required to minimize infiltration of groundwater. The minimum size is 8 in., and slope should be such as to produce a velocity not less than 2 ft. per second as calculated by n equal to 0.013 in Kutter's formula. A table of minimum grades is given as follows:

Diameter of Sewer, In.	Per Cent Grade
8	0.40
10	0.28
12	0.22
15	0.15
18	0.12
24	0.08
27	0.07
30	0.06

Straight alignment and uniform slopes between manholes are recommended. Manholes are desirable at each change in sewer size, direction or slope, at the upper end of all lines and at intervals of 300 ft. along the sewer line where the size is 18 in. or less and 400 ft. for sewers over 18 in. in diameter.

Inverted siphons should comprise two or more pipes having a minimum diameter of 6 in. Such siphons should be provided with all necessary appurtenances for inspection, rodding, flushing and other maintenance. The head and pipe size should be such that a velocity of at least 3 ft. per second will be maintained for the average dry-weather flow.

Intercepting sewers and diversion chambers for the existing combined system should be so designed that three to five times the dry-weather flow will go to the intercepter before overflow takes place, depending upon the character and use of the outlet stream. The chamber should also be provided with a fine screen to keep floating solids and other visible objectionable material from going directly into the stream. The size of openings and screen arrangement will depend upon the local conditions to be met.

Sewage-treatment works

In the discussion of sewage-treatment works general comments are made regarding items such as basic data, degree of treatment, new processes and the various methods of treatment.

Regarding pumps, there is noted the desirability of standby units, non-clogging, automatically-controlled types preceded by screens, and the use of shredding devices or settling tanks before pumping.

Two grit channels are desirable with a proportional weir or other flow-regulating device to maintain 1 ft. per second velocity and 30-sec. detention periods. Septic tanks are taboo; Imhoff tanks

are not recommended for the treatment of certain industrial wastes such as those emanating from milk processing or brewery plants.

Sedimentation tanks should have a minimum settling period of 2.5 hours preceding sprinkling or sand filters, and 1.5 hours preceding activated sludge is suggested. Sludge-digestion compartments should have a minimum capacity of 2.5 cu. ft. per capita for strictly sanitary sewage, 3 cu. ft. for combined sewage when preceding sand or sprinkling filters, 5 cu.ft. for sanitary sewage preceding activated sludge, and 6 cu.ft. for combined sewage. Details of design are covered for such items as flushing rings, gas vents and draw-offs.

It is suggested that open sludge beds should have a capacity of 1 cu. ft. per capita where the secondary treatment is sprinkling or sand filters and 15 cu. ft. for activated sludge. Under glass the drying area can be reduced to 0.75 and 1.25 sq. ft. per capita respectively. For depth, 12 in. of filtering material, of which 4 to 6 in. is sand, is noted as desirable. When vacuum filters, incineration or other means are used, manufacturers' specifications and guarantees govern.

For intermittent sand filters, two units or more are to be provided. Maximum loading should be 1,500 persons per acre, depth 36 in., with sand of effective size between 0.2 and 0.5 m.m., and uniformity coefficient not greater than 3. Dosing tanks are to discharge at twice the rate of inflow and cover the beds 1 to 3 in. deep. Travel shall not exceed 20 ft. between distributing troughs, and splash plates are to be placed at trough openings.

Trickling-filter loading is placed at 3,000 persons per acre-foot, with a maximum net stone depth of 7 ft. and a minimum of 5.5 ft. Spray nozzles, revolving distributors or other established means are considered satisfactory. Proper ventilation and adequate underdrainage should be provided with provision for flooding and for chlorination if odor nuisance is likely. A secondary settling tank of 1-hour detention should always be provided.

In activated-sludge plant operation a minimum of 6 hours' aeration with 0.5 to 2 cu. ft. of air per gallon of sewage is recommended. With mechanical aeration, 8 hours is desired with 25 per cent return of activated sludge, but provision in all types should be made for variations between 10 and 50 per cent return. Pre-aeration for certain industrial wastes or to remove grease is desirable. Secondary settling tanks of 2.5 hours' detention should follow.

If chlorination is used for odor control, application should be as near as practical to the point at which 3 p.p.m. or more of hydrogen sulphide is found to be present. This may be somewhere in the outfall sewer to the treatment works or at the inlet or the outlet of the primary tank. Where split feed is planned, a solution-feed device should be used.

For effluent chlorination, good mixing facilities, followed by a contact period of not less than 15 min. is considered satisfactory. Care should be taken in the location of chlorination equipment so as to protect it against low temperatures and to avoid corrosion of other equipment, accidents to the operating personnel, etc.

It is considered that chemical precipitation does have a place in the field of sewage treatment, and that such plant may satisfactorily meet certain stream conditions. The chemicals proposed must necessarily be of demonstrated effectiveness in the treatment of sewage either by previous satisfactory municipal installation or by competent and complete experiments. The mixing and flocculating period should, in general, exceed 15 min., and the settling-tank detention should be at least 2 hours. Sludge digestion, storage and drying units should be somewhat larger than for ordinary primary sludge, depending upon the chemical dosage and time of operation with chemicals. The engineer should submit this and other pertinent data to explain the capacity he proposes to use.

Pollution Tests for Drinking Water Need Further Investigation

THAT the problem of identifying human fecal pollution in water remains to be solved, in spite of the great advance in tests for detecting pollution in general, was an important point suggested in a paper discussing changes in standards of purity for drinking water, read at the annual meeting of the Illinois Society of Engineers by A. M. Buswell, chief of the Illinois Water Survey. It was shown that in 1880, the National Board of Health began an extensive survey of various tests that had been proposed for detecting pollution in water, and the results were given in the board's annual report for 1882.

The revolutionary germ theory of disease was then generally accepted, and Prof. J. W. Mallet, who was in charge of the work, made it clear that he did not regard the search for chemical substances capable of causing disease as a fruitful line of attack but recommended rather a study of organic matter of animal origin. For a comparison of the selected methods, samples of waters of "known" quality were collected for examination. Of these Chicago hydrant water was taken as an example of known unpolluted character, but within two years that water was the cause of one of the city's worst typhoid outbreaks.

Systematic study of Illinois waters was begun in 1895 by Professor Palmer at the University of Illinois. His standards, based on 1,787 analyses, were published in 1897. He followed a recommendation of Professor Mallet in determining standards for his own locality. The Palmer standards were revised by Dr. Bartow at the University of Illinois in 1907, and they represented the last attempt to correlate chemical data with dangerous pollution. He established five sets of limits and included the newer bacteriological test. The present standards of the U. S. Treasury Department specify limits for important chemical constituants, such as salinity and alkalinity, but there is no attempt to correlate these figures with bacterial pollution.

Further development of bacterial standards was the result of cooperation of laboratories in all parts of the country. By 1912 the 37 deg. C. count on agar had been substituted for the 20 deg. C. count, and lactose had been substituted for glucose in the fermentation test. In 1914 the first Treasury Department standards for drinking water on interstate carriers established the limits for total count at 37 deg. C. as 100 per c.c., and the limit for B. coli as 2 per 100 c.c. The coli content was determined, as at present, by planting five 10-c. c. portions in respective fermentation tubes.

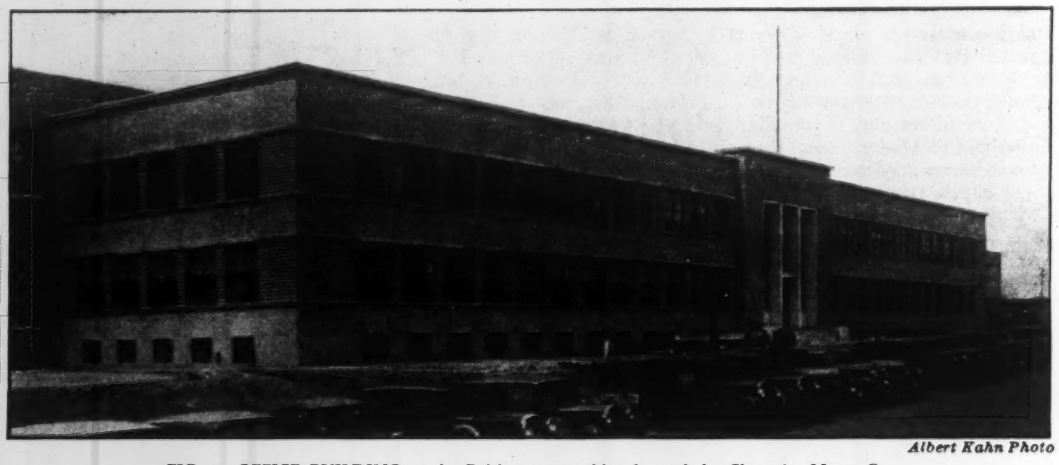
The larger amount of work during the next decade to 1925 led to the adoption of the statistical method of interpreting bacterial analyses for B. coli and the discard of any definite limit for total count. This mathematical treatment of bacterial data has proved so practical in national control of public water supplies that it will continue in use for some time, certainly until the time that radically new laboratory methods are developed.

The main problem that has confronted water analysts—namely, the identification or detection of human fecal pollution—remains unsolved. The chemical attack on this problem was abandoned 30 years ago, and the attempt to reach a bacteriological solution by differentiation of fecal and non-fecal types of organisms has reached a stalemate. Fifty years' work has developed a safe standard for pure drinking water, but we have made comparatively little progress in determining what is an unsafe water.

Industrial Buildings—III

Offices for Industry

Serving as proving grounds for new developments as well as reflecting a belated concern for improved working conditions, the quarters being provided for plant, administrative and clerical staffs lead the procession in modern industrial buildings



Albert Kahn Photo

FIG. 1—OFFICE BUILDING at the Baltimore assembly plant of the Chevrolet Motor Co.

NOWHERE in the field of current building operations are modern and progressive building practices being more widely embraced than in the office structures that house the administrative and clerical forces of industry. It was not so long ago that any penned-off corner of a factory was considered good enough for those who worked on the books.

A half-dozen of these new plant office buildings are singled out for consideration in this article. None of them is structurally a part of the plant that it serves, although they may be connected by weatherproof alleys. Four of them are air-conditioned. Two have welded frames, one frame is composed of expanded metal members, an innovation. Two of the buildings are without windows; in one case the walls are stone masonry, in the other translucent glass block. In the air-conditioned buildings, roof and wall insulation consist of rock wool, glass wool, wood-fiber board and cork. In one case double windows are used. Finally, all of the buildings have architectural merit, presenting a "front" that is quite different from the drab factory walls that have always been associated with industry.

The offices considered are those of the Maytag Washing Machine Co., Newton, Ia.; the Electro-Motive Corp., McCook, Ill.; the Bethlehem Steel Co., Lackawanna, N. Y.; the Owens-Illinois Glass Co., Toledo, Ohio; the Hershey Chocolate Corp., Hershey, Pa.; and the Youngstown Sheet & Tube Co., Youngstown, Ohio.

Welded Expanded Metal Framework

THE BUILDING which will house the office staff at the Bethlehem Steel Company's huge new continuous sheet mill at Lackawanna, N. Y., is one of the most modern elements of this remarkably modern plant. The building is of frame construction, and 15 of the 20 tons of steel required are in the form of expanded metal members used as floor joists, wall studs and wall columns. Walls are 4-in. brick, fastened to waterproofed paper-backed wire mesh by a continuous sheet of mortar. Rock-wool filling is used between the studs. Floors are slag concrete poured on rib lath, stretched over the joists to serve as the forms. Interior columns of rolled sections (of which there are only four) along the center line are placed in partitions, leaving all working spaces unobstructed.

From the standpoint of design innovation, the adaptation of expanded metal studs to office-building purposes is most notable. Viewed as a construction operation, the erection of this building is significant as marking one of the few examples of complete field fabrication; carpentry is an apt characterization of the procedure, for the gas-cutting torch and the arc-welding electrode were used for those operations which in conventional timber framing would be carried out by the saw and the hammer.

The office building, 35x74 ft. in plan, contains two stories and a basement, the latter being as much above ground as below it. The foundation materials were such as to require piles, and steel H-sections driven to shale were used to carry the fourteen small footings required; four of these footings are at corners, two in each side wall, one at the center of each end wall, and four along the longitudinal center line, to support the interior columns. The ex-

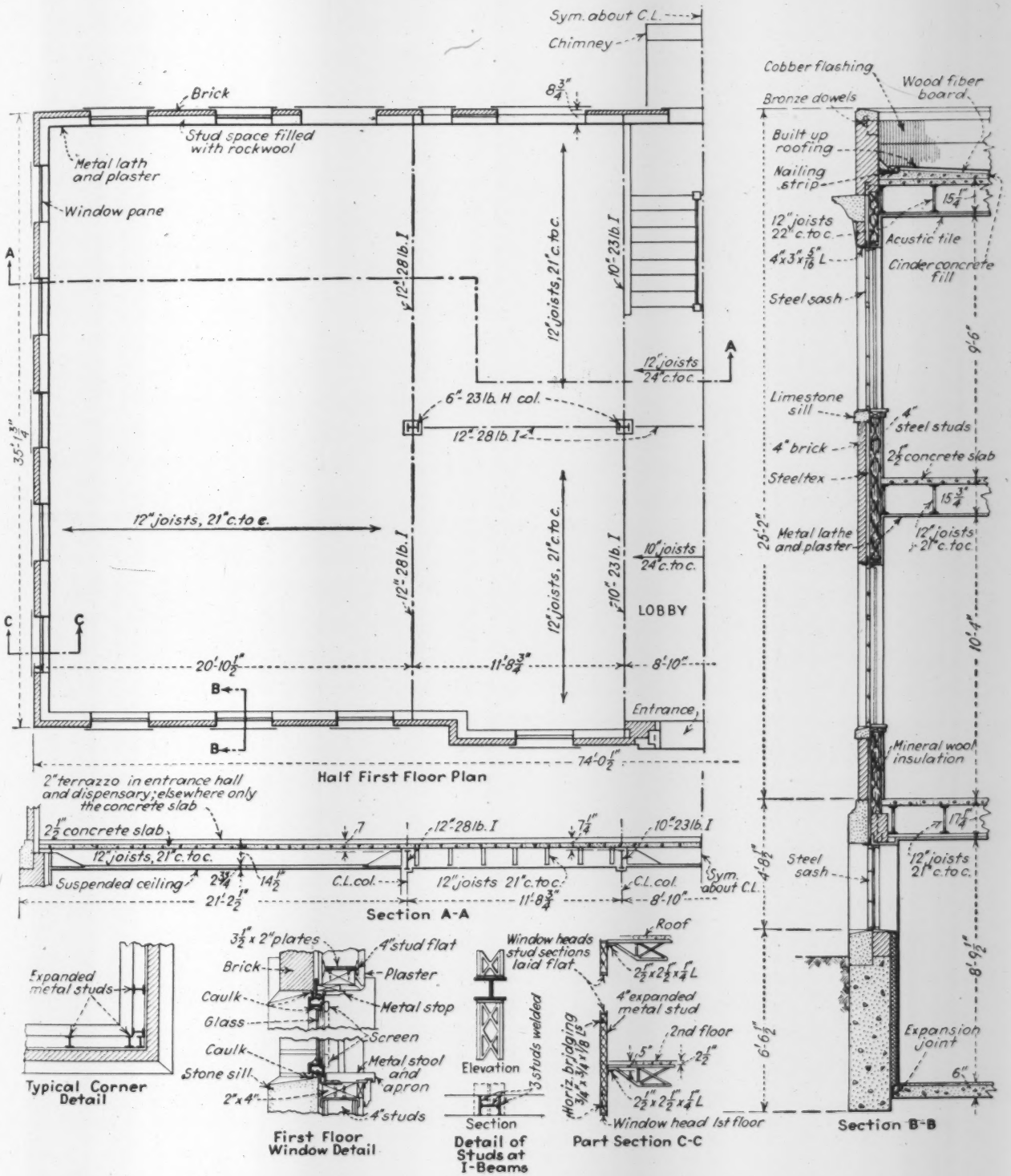


FIG. 2—PLAN AND DETAILS of the new office building of the Bethlehem Steel Co., at Lackawanna, N. Y., in which expanded metal members comprise most of the floor and wall framing.

terior footings are connected by reinforced-concrete beams 21 in. wide and 5½ ft. deep, which carry the building walls.

The floor space is divided into four bays, two at the ends and two at the sides by a row of four 6-in. 23-lb. H-columns along the longitudinal center line. I-beams in the two floors and the roof frame into these columns in both directions, providing support for one end of the expanded metal joists that are carried at the other end by the exterior walls. The framing of these walls consists of 4-in. expanded metal studs used singly or in groups of three fabricated into H-section columns by welding. These stud columns occur at the

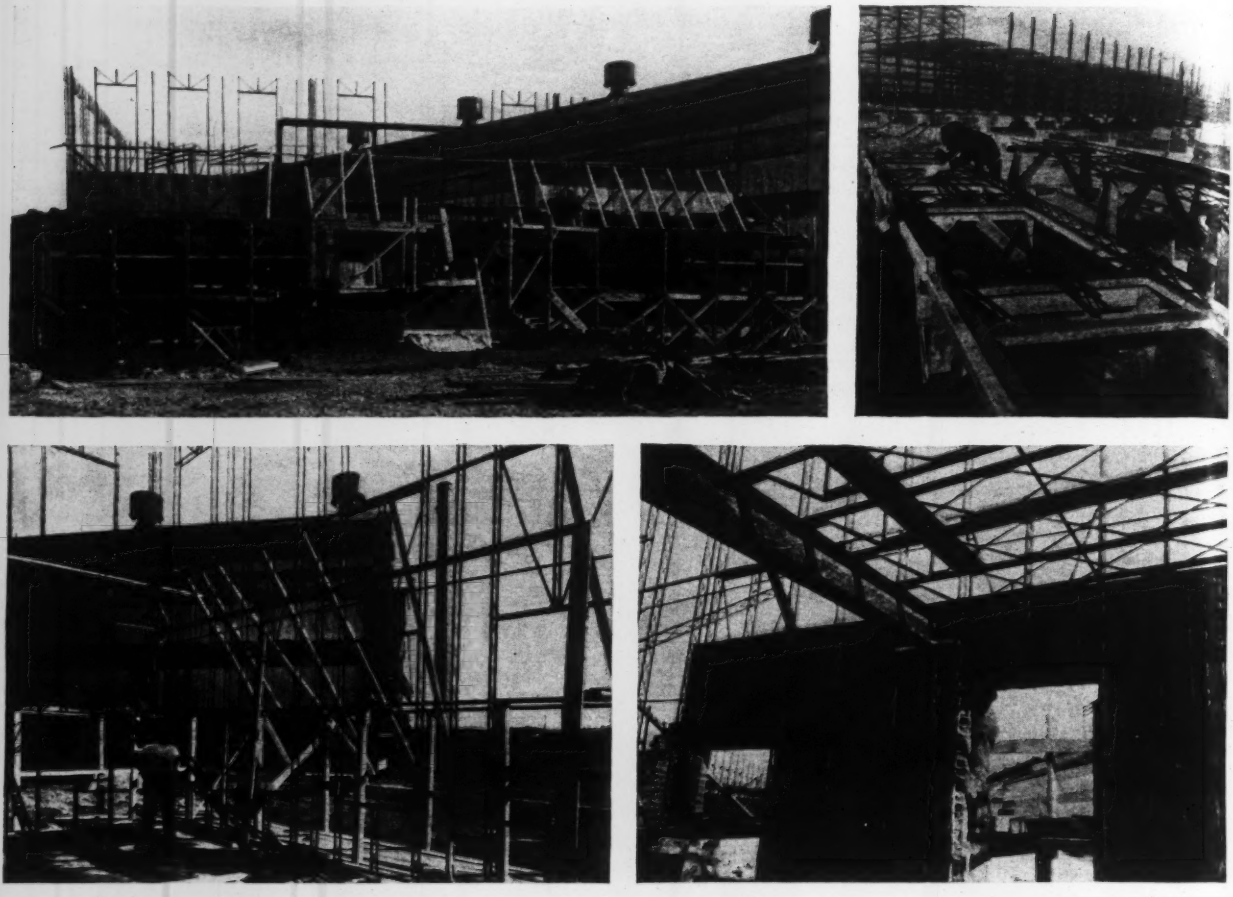


FIG. 3—CREATING A NEW TYPE of building with a welded frame of expanded metal floor joists and wall studs. Top left: wall enclosure following close behind steel erection. The only structural-steel framing, a four-column bent on the longitudinal center line, is also shown. Top right: fabricating a window bay of full building height in the welding jig. Bottom left: erecting wall studs and the shelf angle for floor-joist support. Bottom right: the completed wall, showing one of the stud H-columns under a rolled beam that supports some of the floor joists.

four locations along either side wall, where they are required to support the outer ends of the transverse I-beams. Studs are placed at 2-ft. intervals around the building except at the corners, which are formed by three closely set studs welded together. Except at the windows and doors the studs are used in full two-story length of 22½ ft. Stud sections laid flat comprise the necessary horizontal members in the door and window framing and at the roof level.

Bracing of the frame is largely accomplished by light bridging. This consists in each wall of three lines of ¾x¾x⅛-in. angles threaded through the stud webs and welded to the inside of the exterior upright. These lines of bridging are at the top and bottom of the second-story windows and at the top of the first-story windows. Where joists frame into walls, as is the case for both end walls and for those portions of the side walls opposite the structural-steel framing, 2½x2½x¼-in. shelf angles are used as supports; these angles are welded to the studs and thus serve as additional bracing. In the window bays, V-shaped bridging of 1x⅛-in. flats is used on the exterior faces of the studs between the top of the first and the bottom of the second-story windows and between the top of the second-story windows and the top of the building frame.

The wall framing is covered outside with paper-backed wire mesh, which is wired to the studs. The single-brick exterior wall is laid up about ½ in. clear of the wire mesh, and this space is flushed full of mortar to assure a good bond. The brick veneer is also anchored by brick wall anchors pushed through the building paper and snapped over the outside flange of each frame stud at every fifth course. By filling the stud spaces with 4 in. of mineral wool held in place by lath and plaster, a wall with insulating properties equivalent to a 12-in. brick wall is said to be provided.

Floor joists are mostly 12 in. deep, spaced 21 in. on centers; they are welded at the supports, and for additional stability rely on the 2½-in. slag-concrete floor slab. This slab was placed directly on metal rib lath stretched over the joists and tack-welded to them; a dry mix was used so that it would not run through the lath, and a very satisfactory floor resulted. In the dispensary room and the main entrance lobby, a 2-in. terrazzo topping is used, while elsewhere the slab is merely covered with linoleum. Ceilings are metal lath and plaster in the basement and first floor; on the second floor a suspended ceiling of acoustic tile is used.

The concrete roof slab is covered with a 2-in. cinder concrete fill, 1 in. of wood-fiber board and a built-up roofing paper, to provide an insulating effect comparable to that of the walls.

Erection

With the exception of a few connection details on the rolled sections, field forces managed the entire fabrication and erection of the building. The expanded metal studs came to the job in stock lengths of 22½ ft., so that cutting was necessary only on those required in the center of the window bays. Welding was the principal operation.

After the foundations and basement walls were finished, the four interior columns were erected and the first-floor joists and concrete slabs were placed. Timber jigs on sawhorses were then set up on the completed slab, and field fabrication began. With the gas torches

the short studs used for the tops and the bottoms of the window frames and for the vertical members in the center of the window bays were cut to length. These members, together with the 22½-ft. side studs of the bay, were then assembled in the jigs and welded into erection units. The diagonal bridging of 1x⅛-in. flats used between the windows was also attached at this time. The sawhorse jigs were used in fabricating the stud column sections, made up of three studs welded into an H-section and provided with welded base and cap plates. These columns were made in one-story lengths.

Erection was begun by setting up three or four window bays temporarily steadied by a horizontal timber placed at the bottom of the second-story windows and held in place by timber raker braces extending down to exterior scaffolding. The permanent bridging of ¼x¼x⅛-in. angles was then threaded through the studs and welded, followed by erection and welding of the single full-height studs that occur between the window bays. This sequence of operations was repeated until the framing was up entirely around the building.

The next operation involved installation of floor-joist supports and then the floor joists themselves. At those locations where joists frame end-on into the walls, 2½x2½x¼-in. shelf angles were blocked in position by timber 2x4's and then welded to the studs. The stud columns were set up in the side walls, following which the second-floor I-beams between these columns and the interior columns were installed. The floor joists were then erected and welded to the supports, the rib lath attached, and the second-floor slab poured. The top of the wall framing and the roof framing were finally erected, using the second-floor slab as the working platform. Rope slings comprised the only hoisting equipment on the job.

As soon as frame erection was well under way, the paper wire-mesh backing was applied and the brick masons began laying up the wall, so that by the time the roof slab was poured the building was completely enclosed. Installation of the mineral-wool wall filling was done coincident with wall and ceiling plastering. The rapidity of the construction may be gaged by the fact that stud fabrication required one day, frame erection eleven days, and the building (exclusive of foundations and final interior finish) was built in five weeks.

This unique building was designed by the engineers of the Bethlehem Steel Co. and built by James Stewart & Co., New York City.

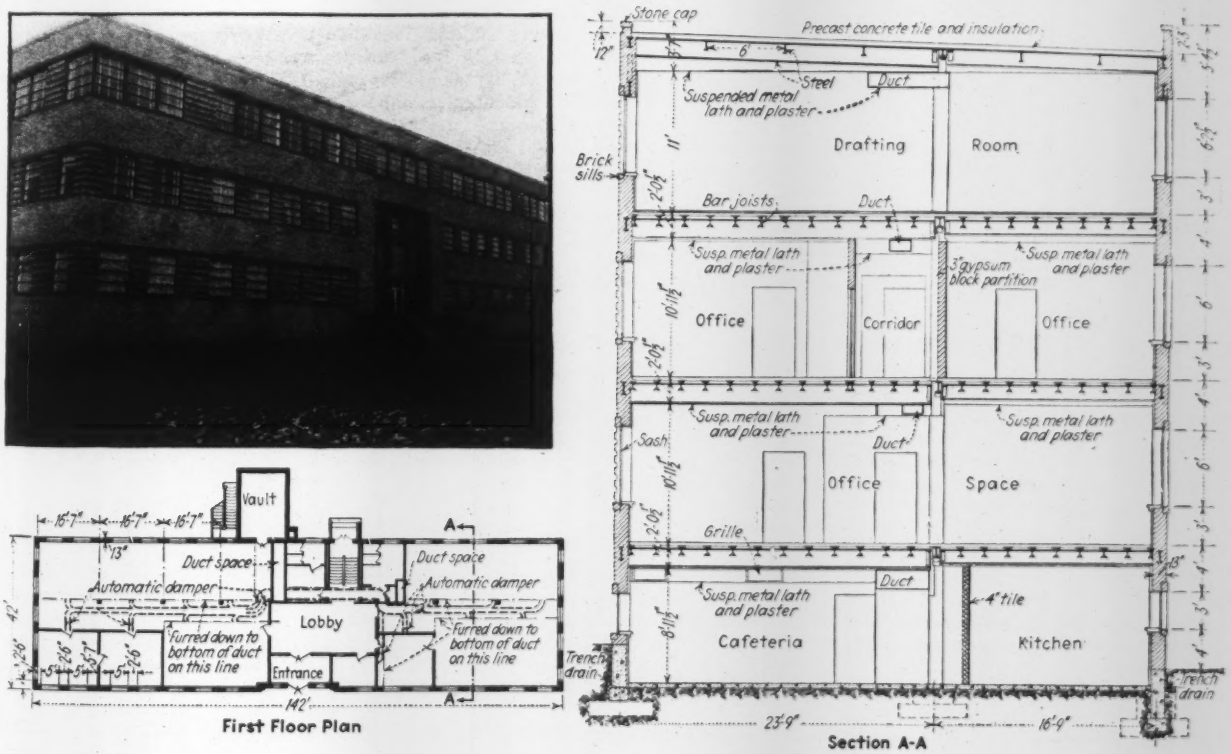
Modern Offices in the Country

IN A CORN-FIELD SETTING, several miles from a town and 15 miles west of Chicago, the Electro Motive Corp., General Motors' subsidiary, has built one of the outstanding industrial plants of the year. The "front" which this plant faces toward the visitor is a three-story office building of such modern and substantial appearance that it dominates both its rural surroundings and industrial background. The modernism of the facade is also reflected in the structural and mechanical elements of the building, for the steel frame is completely welded, and the building is air-conditioned.

Plan dimensions of the building, are 42x142 ft. This area is divided lengthwise by a line of columns giving bays of 23 ft. 9 in. and 16 ft. 9 in. Rolled sections are used for the columns and the girders, and all column-girder connections are arc-welded. These connections consist of shelf angles shop-welded to the columns as erection seats and shear angles welded to the girder webs in the shop and to the columns in the field. The main framing thus is exceedingly simple.

The floor panels are framed with bar joists placed lengthwise of the building on about 2-ft. centers except under the partitions, which are 3-in. gypsum blocks or 6-in. tile, where two joists are used side by side. Floors are 3-in. concrete slabs on metal lath reinforced with wire mesh except under the blueprint room on the third floor and the toilet rooms on the first and second floors, where 5-in. slabs are used. Floors are

FIG. 4—AIR-CONDITIONING LAYOUT of the new office building of the Electro Motive Corp., and the completed facade.



covered with asphalt tile except in the top-floor drafting room, where a $\frac{7}{8}$-in. wood subfloor and a $\frac{13}{16}$-in. maple floor are installed.

Suspended ceilings of lath and plaster are used throughout. Floor-to-floor heights are about 13 ft., giving an effective room height of 11 ft. The roof is of precast cement tiles covered with 1 in. of Celotex and a tar-and-gravel waterproofing. It has a slope from front to back of $\frac{1}{8}$ in. per foot.

The exterior walls impart a distinctive appearance to the building. The 13-in. thickness is made up of 9 in. of tile and a 4-in. brick facing. Windows, pilasters and spandrels (Fig. 4) are developed in horizontal lines; rectangular panes are used in the windows, and the pilasters consist of alternate horizontal lines of light buff and dark brown brick, the dark brick being set out about 1 in. from the general wall surface. The spandrels are outlined top and bottom with lines of dark brick, those at the top constituting the window sills.

Windows are used profusely. On the two lower floors window openings, 5 ft. wide by 6 ft. high, are separated by 2½-ft. pilasters except for one pilaster near each corner of the building that is 5 ft. 7 in. wide. These wide pilasters are the only masonry that interrupts an almost continuous band of windows around the third story, which is devoted to a drafting room. Thus on the long side of this floor there are two 35-ft. runs of windows, a 19½-ft. run, and at the ends 21-ft. runs continuous around the corners.

The third fact of importance that characterizes the Electro Motive Corp.'s office building is the use of a complete automatic air-conditioning system with humidity control. Changes from ordinary structural practice that might be occasioned by the air-conditioning were kept at a minimum, the only one of note being in the walls where fixed windows are used with plate glass ¼ in. thick.

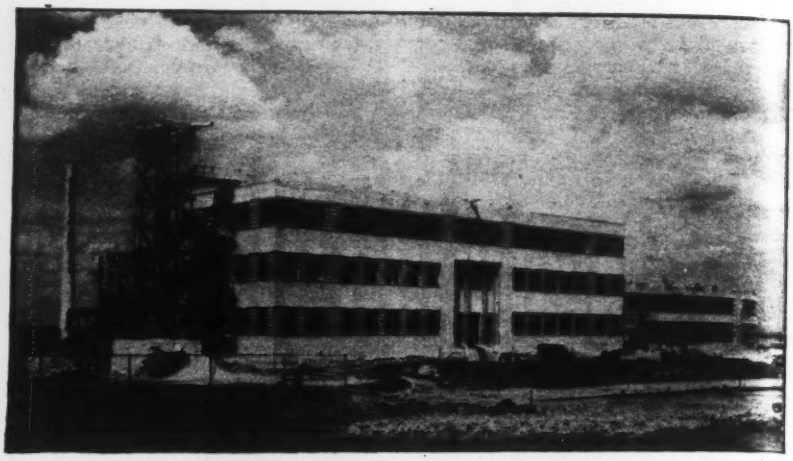


FIG. 5—OFFICE BUILDING of the Electro Motive Corp. under construction in virgin industrial territory near McCook, Ill.

Duct spaces leading up through the building from the mechanical equipment in the basement are accommodated in 6-in. tile enclosures adjacent to the toilet rooms in the center of the building behind the lobby. One of these duct spaces is 2x6 ft., the other 3x16 ft. The main fresh-air duct on each floor runs lengthwise of the building along and at one side of the interior row of columns. Outlets branch off either side as needed for adjacent rooms. Masking of these ducts, so that their appearance will not be objectionable, is skillfully done by furring with lath and plaster. No attempt is made to simulate beams, but in general the furred space is about twice as wide as the duct, which has a tendency to make it less noticeable than if it were more nearly square. In spite of the fact that furred ceilings are used throughout, only on the second floor where the duct follows a corridor is it placed in the ceiling. Elsewhere advantage is taken of the facility with which side outlets can be made from exposed ducts.

The building was designed and built by The Austin Co., Cleveland.

Offices in a One-Industry Town

THE RESPONSIBILITY attaching to the design of an industrial office building in a one-industry town is more obvious and at the same time more compelling than for the usual factory location. Thus such a building is apt to be the largest in the town, and it probably invites immediate comparison with the city hall, the court house and the bank, the other outstanding structures. It is also headquarters for the town's leading citizens as well as for a large percentage of the population. A building out of the ordinary is consequently demanded.

This factor affected the design of the new office building of the Maytag Washing Machine Co. at Newton, Ia., where the company supplies the principal industrial activity in an otherwise agricultural community. Fine woods and marbles are used in the interior of the building. Outside the building is faced with limestone and black granite, and trim and window sash and frames are of aluminum, a material extensively used by the company in its product. Although the building is only two stories high (with provision for a third floor), elevators are installed. Year-round air-conditioning is provided. The instructions given the architects, Thielbar & Fugard, of Chicago, were to produce as fine and durable a building as was possible.

The new building is 214x60 ft. in plan and has a structural-steel frame. Contrary to usual practice, desk and office layouts were allowed to control column spacing, so that uneven bays result. Floors are 4-in. flat slabs, and a concrete slab poured on 1½-in. cork boards laid on the forms is used for the roof. Partition material in the noisy tabulating and bookkeeping machine rooms is compressed shredded redwood plastered on both sides. Architectural cork slabs are used for ceilings both for acoustical and insulating purposes.

As with most of the new industrial office buildings, air-conditioning is the outstanding modern characteristic, and insulation and duct-handling present the principal structural problems. P. G. Burt, of the architects' firm, says of the latter: "The question of allowing and locating space for the air-conditioning system is a fairly obvious one, though many architects will be unpleasantly surprised at the square feet that must be given up for this purpose. Delivery and return ducts, grilles, etc., must not be taken casually. These items are not so obvious in development of plan, but in section and elevation the story and ceiling heights must be studied with full allowance for the mechanical engineer's requirements or there will be unforeseen duct runs and delivery plenums that will have to be furred in and will be as unhappy in effect as an overlooked steel girder. Ducts, furthermore, are apt to be more erratic in location than steel or concrete framing. The architect might as well learn to take the air-conditioning equipment seriously along with steel columns and girders, stairs, elevator hatches, contractors and clients."

The masonry walls of the Maytag Building are lined with cork in 1½-in. slabs attached to the brick backup with asphalt. The cork is covered with metal lath and plaster. Double windows supplement the insulated walls; these consist of an inner casement and an outer double-hung sash, the latter to facilitate washing.

Fresh-air supply ducts are placed in

hung ceilings, in the corridors where possible. All floor-to-floor heights are made especially high to accommodate such ceilings, which also hide the sprinkler pipes.

The air-conditioning system is of the cold liquid type. Four 10-ton and two 20-ton compressor units, each with an integral water-cooled condenser, are installed in a basement room. Condensing water is cooled in a 400-g.p.m. tower built at grade level in an adjoining parking space. The air is cooled and dehumidified in two air washers and distributed through the building in two systems, each having in addition to the washer a separate fan and heating coils. The final water temperature required for dehumidification is obtained by a three-way valve piloted by a dew-point thermostat for each unit. This equipment will also be used during the heating season for winter humidity control. The air is distributed through the ducts at high pressure and delivered through grills of a type giving control not only of the volume of air required but also of the distance and direction the air is blown.

Recirculating ducts with a remote-controlled discharge louvre and a fresh-air intake of ample size are provided to permit operating the plant up to full fresh-air delivery. The building is kept under "pressure," and the quantity of fresh air taken into the system is handled by remote control and kept in direct relation to the discharge of return air through the discharge louvre. All duct work is insulated with cork board, finished with plaster, insuring delivery of air throughout the building at an even temperature. The system is designed to provide a 15 deg. differential between inside and outside temperatures in the summer.

Steel Floors for a Steel-Mill Office

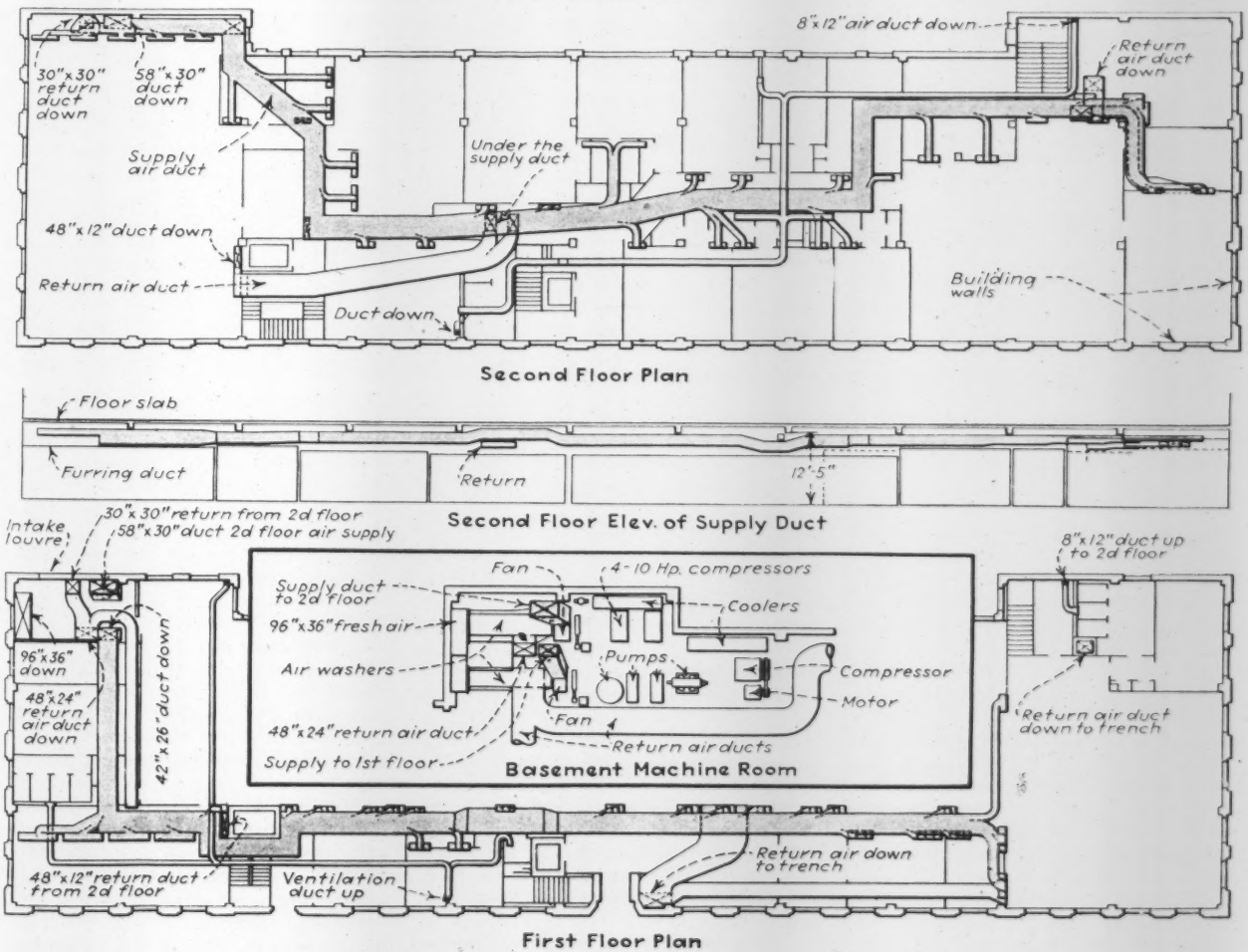
ADJOINING its new strip mill, the Youngstown Sheet & Tube Co. has built a new office building whose design has been made to reflect not only the industrial character of the location but to a certain degree the products of the plant to which it belongs. Thus the frame is of structural steel, and the second floor and roof are of steel plate in a cellular design, marked particularly for its light weight and the flexibility that it offers for the installation of electrical wiring.

The new building, which will house the mill superintendents and their clerical staffs, is two stories high and 110x35 ft. in plan. The ground floor, a concrete slab on earthfill, is devoted to garage, storage space, heating plant and laboratories. The walls are of brick on the outside, backed on the inside with glazed hollow tile, so that no plaster is required. About 15 per cent of the wall area is steel sash.

Cellular type floor

The most interesting characteristic of the building is its use of some 5,850 sq.ft. of cellular steel floor and roof deck. This type of steel floor serves not

FIG. 6—AIR-CONDITIONING DUCTS in the new Maytag Washing Machine Co. offices at Newton, Iowa, are concealed in suspended ceilings in the corridors.



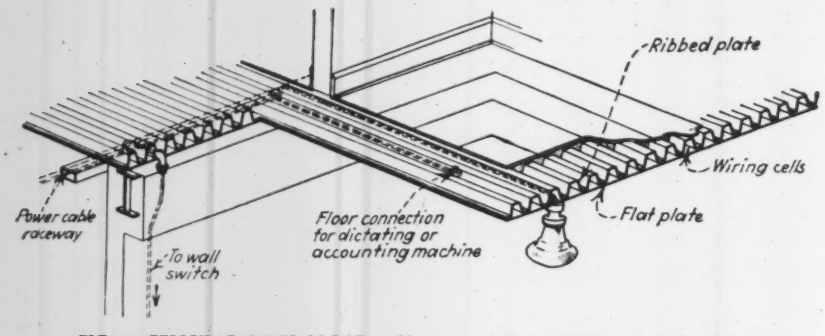


FIG. 7—CELLULAR STEEL FLOOR in Youngstown Sheet and Tube Co. office building provides spaces for wires to be brought to any point from the power-cable raceway. A separate raceway is used for the telephone cables.

FIG. 8—WIRING RACEWAYS, telephone at left and power cable at right, attached to flat steel-plate ceiling. Large subpunched holes register with floor cells, which run at right angles to raceway.

only as a structural element, spanning from the outside walls to a center row of columns but as a means of distributing wiring to all parts of the floor and ceiling for power and lighting; wiring flexibility is a basic requirement, since the office arrangement will be subject to continual rearrangement.

The second-floor construction is composed of units having a flat plate on one side and a ribbed plate on the other, the flat plate being turned down, to form a flat ceiling. The units are welded to the supporting beams, and the side joints between the units are also welded. The inter-cell troughs are filled to the top with a lean mixture of concrete, which provides a uniformly level foundation for a mastic-tile floor covering. This tile flooring is laid on a ½-in. layer of emulsified asphaltic concrete.

Wiring flexibility is inherent in the floor design, since it furnishes a series of troughs completely across the building on 6-in. centers (Fig. 7). The main conductors are brought in transverse to these cells in inverted troughs or raceways attached to the under side of the flat-plate ceiling by screws; separate raceways are provided for the power wiring and the telephone wiring. Holes subpunched on 6-in. centers along the center line of the raceway are placed to register with the inter-cell troughs of the floor units and accommodate the screws that attach the raceway to the floor. Other holes, also on 12-in. centers but off the center line of the raceway, register with the cells. Where wires are required to branch from the raceway into the floors, these holes are cut through and special grommets are applied (Fig. 8); through these relatively large holes the wires may be readily drawn out into the floor or ceiling.

For the roof deck the unit is turned over, with the ribbed plate below. The flat plate on top is then insulated with 1 in. of wood fiber board and waterproofing. A hung acoustical ceiling is used, attached to runner channels carried from small S hooks that engage in ⅜ in. holes in the vertical web of the keystone shaped cells. This acoustical ceiling it is believed will prove particularly useful in this building because of the hard surfaces of the glazed tile wall and the mastic tile floor.

A.S.T.M. Committee Actions on Metals and Concrete

AS A RESULT of the large number of committee meetings at the regional convention of the American Society for Testing Materials in Pittsburgh March 2-6, a number of new standard specifications are to be recommended to the society. The total registered attendance was about 625, exceeding that of any previous year. Among the committee actions the following, relative to steel, cement, wrought iron and concrete, are of particular interest.

Extensive revisions of the present standard specifications for structural nickel steel (A 8-29) were approved in the form of a new proposed tentative specification. If this is approved by the society, the existing standard will be withdrawn. The requirements for tensile strength have been raised to a range of 90,000 to 115,000 lb. per sq.in., with a minimum yield point of 55,000 lb. The chemical requirements on ladle analysis provide for a maximum permissible carbon of 0.43, maximum manganese 0.80, and a nickel range of 3 to 4 per cent.

New specification requirements covering welded wire fabric and also bar or rod mats for concrete reinforcement were developed. Further study will be made of the requirements for expanded metal reinforcement. It was decided to write a separate specification for woven wire fabric. The tentative specification for axle steel concrete reinforcement bars was recommended for adoption as standard.

It was decided to retain as tentative for another year the specifications for wrought-iron plates (A 42-35 T), because the specifications represent such a considerable departure from the usual wrought-iron specifications.

The present tentative specifications for high-early-strength portland cement (C 74-30 T) were recommended to be changed slightly and offered for adoption as standard. Among the changes are a revision of the wording of the definition, the replacement of the present fineness requirement by a specific surface requirement, and provision for optional strength tests, either the standard tensile test or a compressive strength determination on 2-in. mortar cubes. A suggested specification for blended cement was distributed to members of the committee for study. A proposed revised definition for portland cement was rejected by vote of the committee.

A new tentative method of flexure-testing of concrete, which makes use of the third-point loading method in conformity with the method of the American Association of State Highway Officials, was developed and will be offered for adoption at the annual meeting by the committee on concrete and concrete aggregates.

Approval of new tentative specifications for hydraulic hydrated lime was voted, since American manufacturers are now prepared to produce this material, which has been used for many years in Europe for construction purposes.

Current Notes on Sewage Disposal

An analytical summary of recent developments for the engineer, research worker and plant operator

SPRAYING FRESH SOLIDS IN DIGESTORS

Various methods for the introduction of fresh solids in separate sludge-digestion tanks, to obtain continuous and more even distribution have been tried by increasing the number of top inlets, the use of mixing devices such as pumps and scrapers, the installation of troughs with holes placed over the sludge surface, side inlets, etc. All distribution systems have some drawbacks, either imaginary or real. Several years ago it was proposed to distribute the sludge by letting it drop on rotating slanting blades similar to those of an electric fan, but no results have come to our attention. Muller (*Stadtereingung*, No. 27, p. 585, 1935), after describing difficulties encountered with different methods, presents comparative results obtained at Nuremberg in heated digestion tanks, employing a vertical rotating sheet which sprays incoming solids over an area 25 ft. in diameter. Experience so far has shown that scum formation is reduced to a minimum, and that on an average 15 per cent more gas is produced with slightly less carbon dioxide content. It is believed that the use of this scheme will enable the digestion-tank capacity at Nuremberg to be reduced to 0.4 cu.ft. per capita, whereas previously a 1 cu.ft. allowance was insufficient.

* * *

DEWATERING OF SECONDARY SLUDGE

Practical experience has shown that settled sludge discharged from trickling filters is much more difficult to dewater than sludge settled from fresh sewage. Keefer and Kratz (*Sewage Works Journal*, Vol. 7, 1935, p. 963) have confirmed this at Baltimore. They were unable to produce a good filter cake (low moisture content) with chlorinated copperas and obtained only a small yield with ferric chloride. Elutriation of sludge in two steps, by adding clear water followed by settling and decanting, and then repeating this procedure, required less iron salt. Partly digesting the secondary sludge and then mixing it with digested primary sludge, followed by elutriation of the entire mass, produced results comparable to those usually obtained with digested sludge. It appears, therefore, that partial digestion of the secondary sludge is essential to destroy the slimy material; the soluble material can then be washed out and the resulting mass dewatered on vacuum filters.

* * *

TEMPERATURE AND BIOCHEMICAL REACTION

According to Van't Hoff's law, the velocity of a chemical reaction doubles or trebles every 10 deg. C. Biological reaction, however, follows this rule only within certain limits when conditions are not too complex. Experiments to determine the most effective operating temperature for the activated-sludge process were conducted at Leipzig by Viehl (*Gesundheits Ingenieur*, No. 58, 1935). He found that the oxidation of inorganic nitrogen follows Van't Hoff's law between 2 and 25 deg. C., but this relationship did not apply in the case of aerobic destruction of organic matter. In biological sewage treatment the purely chemical oxidation is extremely small in comparison with the biochemical destruction. The bacteriological flora adapts itself rapidly to the temperature, and seasonal variations of sewage temperatures are therefore of much less importance than would be expected; in polluted streams, however, the effect of temperature is quite pronounced.

* * *

LAKES AND SEWAGE TREATMENT

The use of ponds or lakes as auxiliaries for partial treatment of sewage has been demonstrated to be of considerable importance. The natural self-purification that normally takes place in ponds or lakes can thus be utilized in place of secondary sewage-treatment methods. With sufficient flow movement in lakes receiving effluents from domestic sewage-treatment plants only, no difficulties have been encountered where the system has been practiced. Brentano (*Wasser und Abwasser*, Jan., 1935) calls attention to the strong surface pollution of the Wettinger Lake surface near Zurich, Switzerland, caused by lime soaps. The Zurich industries discharge considerable quantities of fatty acids which, after passing through a primary treatment plant, combine with the lime salts in the river leading to the lake. So long as the lake receiving the river water and sewage effluent was open to flow, no difficulties were observed, but after the lake was impounded the scum became noticeable, and eventually the condition was one of gross pollution.

THE ECONOMICS OF SLUDGE DISPOSAL

The larger the sewage-treatment plant the greater becomes the problem of ultimate sludge disposal. Advances in the treatment of sludge by improved methods of digestion, dewatering by vacuum filtration and by centrifuges, and quick drying with the aid of heat exchangers have promoted the idea of complete disposal by incineration. Experiments and plant-scale tests have shown that the digestion process can be eliminated when sludge is to be dewatered and incinerated. The different methods of treatment for ultimate disposal have in general been so widely developed that the economics of the various method has become one of major considerations in plant design and operation.

At a meeting of the New York State Sewage Works Association, held on Jan. 15, a paper by A. J. Fischer analysed the installation and operating costs of sludge-disposal methods for 2, 5, 10, 25, 50 and 100-m.g.d. plants producing different types of sludge. The data were obtained from a survey of existing plants, and consequently some of the cost estimates, based upon only a small number of installations, may be considerably modified in the light of future developments. Local factors dealing with dumping ground available, market for fertilizer, proximity of houses, in addition to the size of the plant, exert considerable influence on the method of treatment adopted.

As might be expected, the studies show that in general, for plants up to 10 m.g.d., digestion and sand drying is most economical, although the adoption of heat drying of digested sludge may be favorable if it is planned to sell the finished product as fertilizer. There are only a few incinerator installations from which data are available, but these indicate that this is the most costly method of ultimate disposal except for plants above 25 m.g.d.

It is highly probable that with the improved methods of sludge conditioning, mechanical devices for dewatering will become more favored. Each specific problem must be analyzed with local conditions taken into consideration, including land requirements, nuisances and efficiency of operation to be expected, before a decision can be made. This holds especially for the smaller plant, where initial cost is often not as important as some of the other factors mentioned.

Rational Road Plan for New York

Legislative commission recommends long-time plan of highway improvement with definite allocation of expenditures

UNDER A PLAN for highway development in New York a legislative commission created in 1934 recommends the expenditure of a uniform amount each year for five years. The amount to be spent will be the income from a 3c. gasoline tax and the present motor-vehicle license fees definitely allocated to road improvement. All roads of the state (100,233 miles) are to share in the expenditure in proportion to their traffic and social importance. Towns, counties, state and cities all receive definite shares; the types of roads range from submarginal land-service roads to arterial metropolitan roads of the highest structural excellence. The recommended annual expenditure is $88,000,000 of state funds, all obtained by road-user taxes, supplemented by federal-aid funds to bring the total to $92,000,000, distributed over 100,000 miles of highways.

The intent of the plan is to stabilize income and expenditures, to benefit all communities and to permit each to plan ahead for a definite, tied-together system of roads fitted to its needs. By the plan all highways, local and trunk-line, have a share for the first time in the taxes paid by motor-vehicle users of the roads. The sources and the proposed distribution of these funds are given in the following figures.

REVENUES

Fuel and registration tax	$88,000,000
Regular federal aid	6,150,000
Total	$94,150,000

EXPENDITURES

State:	
Maintenance	$9,000,000
Reconstruction state system, including bridges and right-of-way (5-year plan)	27,500,000
Sanding and snow removal	1,500,000
Construction state system, including parkways outside cities (8-year plan)	10,000,000
Total	$48,000,000
County:	
State aid	$2,000,000
Refund registration fees and fuel tax	12,000,000
*Reconstruction county road system	3,000,000
Total	$17,000,000
Towns:	
State aid	$3,000,000
*Construction and reconstruction of town roads by the county	4,000,000
Total	$7,000,000
Cities Outside New York:	
*Construction and reconstruction of arterial and bypass highways by the state	$7,000,000
*State aid	3,000,000
Total	$10,000,000
New York City:	
Refund registration fees and fuel tax	$6,000,000
*Construction and reconstruction of arterial highways and bypasses	4,000,000
Total	$10,000,000
Grand Total	$92,000,000

*Items totaling $21,000,000 are new disbursements to governmental units

The new allotments of money amounting to $21,000,000 shown in the tabulation are supplemented by increases in present allotments; for example, the sum of $1,500,000 for sanding and snow removal is largely increase.

The work planned

The total mileage of highways which the report considers for improvement is made up as follows:

Class	Miles	Per Cent
State system	13,562	14
County system	17,666	18
Town system	52,757	52
City system	10,713	11
Village system	5,535	5
Total	100,233	100

On the state system it is proposed to complete the construction of the state highways on an eight-year program, to reconstruct, resurface or widen, 5,300 miles of highways, including bridges on a five-year program; to secure the rights-of-way necessary in the construction or reconstruction of highways to be acquired by and at the expense of the state, and to assume general supervision of snow removal and sanding on the state system, this work to be performed under agreements with the counties.

The work planned for county roads is to complete the construction of the county road system as now shown on official maps; to provide additional state aid toward the reconstruction of a portion of the county system; and to continue present state aid to counties in accordance with existing law. On town roads it is proposed to complete the construction of the town highway system and provide additional state aid toward the cost of such completion, and to continue present state aid to towns in accordance with existing law.

The work planned for cities is all in a new field; it provides for the construction at state expense of a system of arterial and bypass highways in and through upstate cities on a five-year program. Also the plan provides state aid to upstate cities for general highway and street maintenance purposes, and additional state aid to New York City for arterial and bypass highway construction.

In addition to these specific local undertakings, general operations and improvements are proposed as follows:

1. Relieve the state, counties and towns of liability for damages on highways caused by snow and ice.
2. Construct sidewalks as a part of the cost of highways.
3. Install highway illumination on a limited mileage (100 miles) on the state system, to determine desirability, effectiveness and cost.
4. Remove all advertising signs adjacent to public highways which constitute a hazard to traffic.
5. Further study the classification of highways with a view of limiting the loads that may be transported over the various systems.
6. Provide for extending the parkway system outside the cities.
7. Provide a more uniform method of marking by directional signs to promote traffic on less-frequented highways and to designate more clearly routes to be followed in passing through cities.
8. Continue to refund to counties and New York City fuel tax and registration fees on basis of present laws.
9. Adopt the average annual highway program recommended by the committee to be financed from a 3c. fuel tax and present registration fees, the major items not to become effective until 1937 and thus not affect the present budget appropriations.

Plan based on exhaustive study

The report is based on an exhaustive traffic census, road-use survey and financial survey directed by the state highway department and the Bureau of Public Roads and participated in by state, city, county and town road departments and many agencies and organizations concerned in highway transport. It comprises 20 chapters and voluminous appendices giving the survey data in detail.

The committee believes that its conclusions, recommendations, figures and estimates are all based on statistical facts accumulated in the most careful survey of a highway system ever made in this country. The underlying statistical data, including the results of traffic surveys, traffic counts, maps showing location of all town roads and how much traffic they bear, will make up several volumes and will be filed in the near future to become a permanent record of the state on which all future highway policy can be based. An actual examination of 50,000 miles of town highways was made during the course of this investigation, and the committee had the advantage of a road-use survey made for the committee by the Federal Bureau of Public Roads. The figures wherever quoted are the most accurate that could be obtained, and the committee does not feel that any of them can be successfully challenged.

Roy G. Finch, former state engineer,

is the executive engineer of this committee and has had general supervision of the survey. The committee has also had the services and technical advice of Elmer C. Lawton, deputy commissioner of highways. The committee has had the most complete cooperation from the Department of Public Works, the Federal Bureau of Public Roads, the agricultural experiment stations at Cornell University, the Association of County Superintendents, the Mayors Conference; Association of City and Village Engineers, town officials, automobile and agricultural interests, the construction industry and many other groups.

Due to the cooperation of these agencies, the committee has been able to collect data and conduct the most extensive traffic counts and highway surveys ever undertaken by this state, the actual cost of which is conservatively estimated at $300,000. Due to this cooperation the committee has required an appropriation from the state of only $40,000.

Plugging Old Artesian Wells to Stop Underground Water Loss

Conservancy district in New Mexico under state regulation cements off wells that cause leakage from artesian storages into upper strata—A total of 114 wells has been plugged in five years

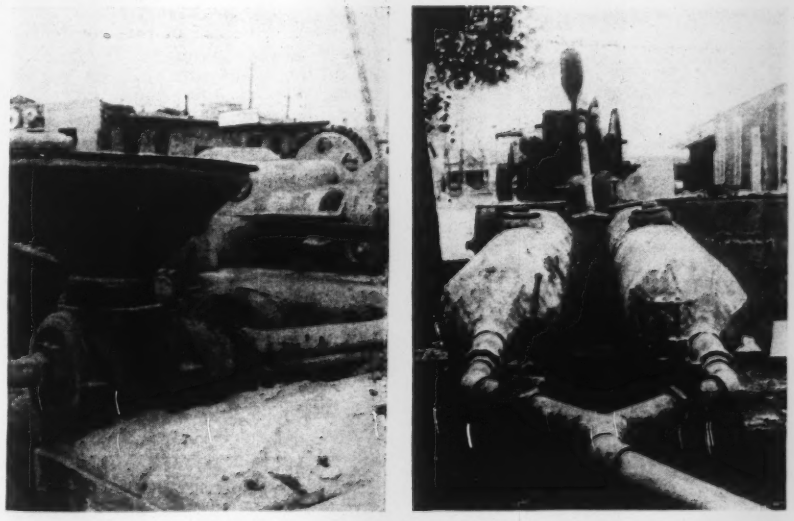
By Thomas M. McClure
State Engineer, New Mexico

AS LONG AGO as 1905 New Mexico passed a law prohibiting the waste of artesian water; since then there has been constantly increasing attention to protection and conservation of water supplies in the artesian basins underlying the Pecos Valley and other areas of the state where sole dependence is placed on underground storages. In the last five years state funds have been available for stopping loss of artesian water by plugging abandoned wells that tap the artesian basin.

At first plugging was done under contract awarded and supervised by the state engineer. Thirty wells had been so plugged, at an average cost to the state of $437.50 per well, when the contractor was excused from proceeding with the remainder of his contract. It had become obvious that the requirements of each well were so different that it was not possible to make an accurate advance estimate of a fair price for plugging any particular well. The Pecos Valley Conservancy District then set about developing equipment specially adapted for well plugging, and also assembled crews with which to do the work. When this organization had been well trained, it was plugging wells at an average cost of $250 each. Some of the essentials in the operating program are set forth in the following.

There is considerable variation in the depth of the limestone caprock overlying the aquifer, which is the major source of artesian supply. In the northern part of the basin the depth does not exceed about 230 ft.; to the south, however, depths range up to 1,100 ft. Wells put down through this limestone cap into water rock of the artesian storage basin will flow with surface pressures ranging from 6 to 50 lb. per sq.in. in the lower part of the basin, when the underground storage is not too greatly depleted. The condition to be remedied by the present operations is the result of the rusting out of old artesian well casings, which permitted water from beneath the limestone cap to escape continuously into the overlying porous strata and hence to constitute a drain on the supply that delivers water at ground surface without pumping costs.

The technique of early well drilling was deficient in several respects. In addition to collapse of casings, there was leakage around the casing of some wells where they were seated in the caprock. Thorough inspection, the plugging of leaky wells, and promulgation of strict regulations governing all replacement wells already have effected an important saving of underground water supply. When the plugging program has been completed, the increase in artesian head throughout the basin is expected to average at least 30 ft. This will mean a saving of many thousands of dollars to farmers, because wells that now have to be pumped in the irrigation season will again become flowing wells, eliminating the necessity of pumping.



PLUGGING ARTESIAN WELLS in New Mexico. The mixing jet (left-hand view) consists essentially of a sheet-metal funnel through which ground clay is fed into a tee. A high-pressure jet coming in from the left and discharging through a somewhat larger pipe to the right mixes clay and water into fluid mud. View at right shows twin torpedoes. These are parallel enlargements in a mud-delivery pipe by means of which roughage is mixed with the mud; each cylinder is alternately charged and discharged.

Methods used in plugging

The principle involved in plugging is first to fill the well with a heavy fluid mud, whose specific gravity is sufficient to overcome the artesian pressure; then to put down cement, which because of its higher specific gravity displaces the mud and fills the hole in the rock through which water has been escaping from the artesian basin.

The first requirement in closing off the flow through a leaky well is to get a line of tubing, usually 2 in. in diameter, down to the caprock. This is a relatively simple operation in a well that has no obstructions, but where it is necessary to clear away obstructions more care and equipment are necessary.

If obstructions have to be pierced in placing the tubing, a drill bit is attached to the bottom of the tubing string, and by means of a Kelly bar and swivel the pipe is rotated as it goes down. Either fluid mud or water is discharged constantly through the tubing as it goes down, to aid in the "drilling" and to keep the tubing clear. It is preferable to use clear water instead of fluid mud while rotating the tubing to the desired point, but if the well appears to be caving it is necessary to use heavy fluid mud to assist in holding back the caving material until the tubing reaches the desired depth. An objection to the use of mud fluid is that if several days are required to get the tubing into place the clay will settle, often making it difficult or impossible to continue tube rotation. This settling may become serious enough to reduce the chances for obtaining a perfect cement plug in the caprock.

When the tubing reaches the upper surface of the caprock, mud pumps are connected up and rough material such as cotton hulls, linters, etc., is mixed with the mud to seal the porous water rock (below the caprock) without requiring an excess amount of mud. After a period of mud pumping, water should appear at the top of the casing, indicating that the bottom of the well has been filled and that there is no steady loss of either mud or water in the water rock or off through any underground leak.

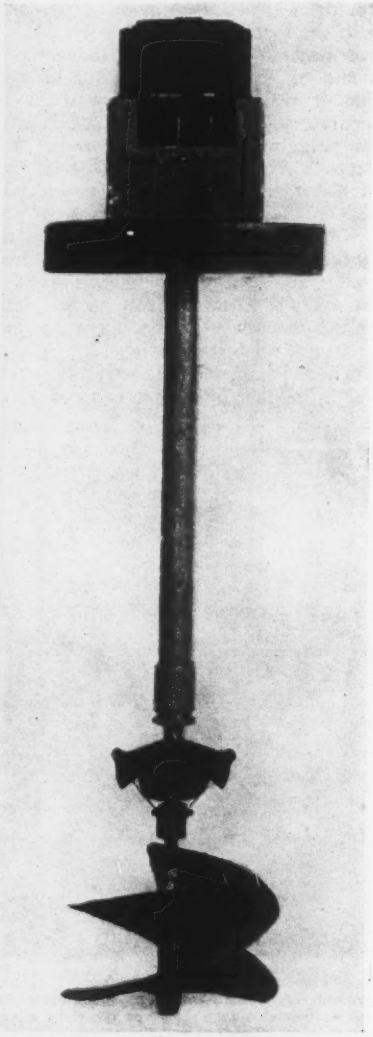
The pumping in of mud is continued until, in addition to the water, return of mud at the top of the casing is equal in weight to the rate at which mud is being pumped into the well. Even a temporary interruption of the mud pumping before this condition is reached might mean the loss of whatever mud had been pumped into the well, because the artesian pressure easily would be sufficient to lift and wash out the mud, carrying it away through some underground leak or in the case of a flowing well, over the top of the casing.

The mixing of mud with water is done in such a way as to secure a fluid weighing about 14 lb. per gal. (specific gravity 1.64). In a 250-ft. well completely filled with 14-lb. mud, the pressure at the bottom will be 177 lb. per sq.in., while the water pressure (assuming a 6-lb. artesian pressure at the surface) would be only 114 lb. per sq. in. Therefore, when the well is completely filled with fluid mud there can be no circulation or movement of water.

The next procedure is to set a cement plug in the caprock below the casing seat. Ordinarily 10 to 20 sacks of cement are used per plug. The cement is mixed with water only, to a consistency that will allow it to flow readily through a 2-in. tubing. Thus mixed, the cement has a specific gravity of about 2.34. It is pumped down by the same method used in placing the mud. The cement is heavy enough to displace the mud column, which rises while the cement sinks into the caprock, where it should make a perfect plug.

When sufficient cement has been placed, more mud is forced down, to clear the tubing of all cement. The tubing is then removed, and after a small amount of fluid mud is added at the top of the well to take the place of the space occupied by the 2-in. tubing the plugging operation is complete. The mud pumped into the well in the process of plugging will settle, leaving clear water on top. For this reason it is advisable to visit the well daily for about ten days after plugging, to refill the top of the hole with heavy mud. After a few such replacements the well will remain full of heavy mud, which becomes plastic but never hard. Thus if a small leak should develop around the edge of the cement, the heavy plastic clay would tend to seal it.

It is customary to use ten sacks of cement to set a plug in a 6-in. well through caprock of, say, 14 ft. thickness. Theoretically ten sacks would fill a 6-in. hole for a 50-ft. depth, but it has been found that flowing water by eroding the limestone makes the hole much larger than the size originally drilled. Ten sacks of cement was decided upon as the desirable amount to use in making sure of getting an adequate caprock plug.



ARTESIAN-WELL METER used to measure water in free-flowing wells.

Operation of equipment

Equipment assembled by the Pecos Valley Artesian Conservancy District was selected solely with a view to its effectiveness in plugging. Although it resembles a drilling rig and could be used for that purpose, it is different; ordinary drilling equipment is not suitable for plugging. The major items in a complete plugging outfit are: rotary machine, mast, hoist, mud pump, water pump, clay mixing jet, clay-grinding equipment and twin "torpedoes." The latter are simply charging chambers in which roughage is added to the mud.

The rotary table and hoist are mounted on a solid rubber-tired trailer powered by a four-cylinder gasoline motor which can drive both units separately or simultaneously as desired. The rotary table is used much in the same manner as in drilling a well; its purpose is to clear the hole of obstructions and aid in getting the tubing to the desired depth. The hoist merely lifts or lowers the string of tubing.

The Kelly bar already mentioned is a 22-ft. length of 2½-in. extra-heavy tubing with three rods welded longitudinally on the outside to fit a spider mounted on the rotary table. This arrangement causes the Kelly bar to rotate with the table and allows it to enter the well at the same time. When the tubing string has been put down in the well the full length of the Kelly bar, the bar is removed and a joint of tubing is inserted to take its place. The Kelly bar is then re-attached to the tubing and rotation is resumed. The use of this equipment is nearly always required because most abandoned wells are more or less filled with debris that has fallen in from the top, or sand and gravel that has come in through rusted-out holes in the casing.

The mud and water pumps are also mounted on a trailer. These two units are powered by a single eight-cylinder gasoline motor with a truck-type transmission. The pumps are driven from a jack shaft with a friction clutch to each unit, so that they may be used separately or together. The mud pump is a 7¼x10-in. double-acting unit with a capacity of 350 gal. per min. at 500 lb. per sq.in. Unless heavy sand obstructions are encountered, low pressures are sufficient to force the mud fluid into the well. Where very high pressures are required, relatively little volume is necessary; so, by having a truck-type transmission on the power plant with four forward speeds, it is possible to slow the pump down and still retain power and secure very high unit pressures.

A 3-in. rotary pump supplies the water under pressure required for mixing the clay. This pump, capable of delivering 100 g.p.m. at 100 lb. per sq.in., has a suction line that can be run to a tank or sump, where it can pick up the supply.

The mixing jet consists of a 7-in. pipe tee mounted so that a metal funnel on the opening turned upward can receive the ground clay and feed it down into a jet from the pressure pump coming in at the rear of the tee and discharging through it in a straight line. The 7-in. tee has reducers on the opposite ends: a ¾-in. pipe at the rear where the water jet comes in, and a 3-in. connection on the forward end where a 4-ft. length of 3-in. discharge pipe assists in mixing the clay. The discharge pipe delivers a well-mixed fluid mud into a wooden box 4x8 ft. in plan and 3 ft. deep that serves as a sump for the mud pump, which forces the fluid mud into the well.

The clay is ground in advance by a hammermill grinder driven by gasoline motor. The product is chuted into sacks. It is necessary that the clay be thoroughly dried before it is ground, otherwise the ⅛-in. screens through which it is passed would become clogged. Drying is accomplished by repeated turning and disking in a location where it is exposed to the sun's rays. This is done where the raw material is secured from the clay pits located at several points in the basin. An average day's run of the grinding equipment is from 20 to 30 tons.

Delivered to the plugging operations in sacks, the clay is dumped into the funnel of the 7-in. tee just fast enough so that the high-pressure jet thoroughly mixes it into a fluid by the time it has passed out through the 4-ft. discharge line. The capacity of this jetting device under the pressures ordinarily used is about 20 tons of dry mixture per hour of operation.

The so-called "torpedoes" are two 15½-in. pipes 8 ft. long mounted side by side and reduced on both ends by swedge nipples to 2-in. pipe connections. At both ends of the torpedoes are wye connections which join the 2-in. terminals into a single 2-in. main line. The torpedoes are set between the mud pump and the well and are used to insert roughage into the mud pumped in during the early stages of mudding. This roughage aids in bridging off cavities and in stopping flow into the water rock, which otherwise would use up an unnecessarily large amount of mud. On the upper side of each torpedo is a 6-in. filler neck, and on the under side is a 3-in. drain. While one torpedo is being charged with roughage, the mud pump is discharging through the other. Thus by switching connections an almost constant flow of mud with a roughage admixture can be maintained while mudding off the well.

The number of abandoned wells plugged by the state engineer, and later by the district formed to carry on this work, totals 114. It was impossible to make an underground leakage test in all the wells on which work was done because in some the casing had collapsed and it was impossible to insert the leakage meter. However, it is conservatively estimated that wasteful leakage saved to the artesian basin now amounts to a flow of 78 sec.-ft., or 56,472 acre-ft. per season.

When rainfall is below normal, there naturally is an increased draft on the basin for irrigation and a reduced quantity of recharge. The average water levels in the basin for 1933 and 1934 dropped slightly below the levels of the previous year, but 1935 rains in the valley and on the principal intake area resulted in raising water levels throughout the basin 6 ft. above the level for corresponding dates in 1934, and the basin now has recovered to levels comparable with those of 1927.

A further conservation of artesian water is being effected by driving new and properly cased wells to replace those that have become defective and leaky, plugging the leaky wells as soon as the replacements are ready. This class of plugging has to be done by the individual at his own expense. Thus far about 60 defective artesian wells have been plugged and replaced by 32 new wells.

The wells to be replaced usually are 6 and 8 in. in diameter. It is hardly practicable to insist that an applicant replace a 6-in. well with another of the same diameter. Instead, 10-, 12½- or even 15½-in. wells have been permitted. An investment in one of these larger sizes has the advantage that when the original casing rusts out a smaller size may be inserted. Another side to this, however, is that with a larger well and potentially more water than the owner is entitled to under his appropriation he is tempted to bring additional land under cultivation. To prevent this, the state is experimenting with meters that can be used in all artesian wells to measure out to each well operator the quantity of water to which he is entitled.

The need for a meter that would fit the requirements of artesian wells has led to a number of tests on 8-, 10- and 12-in. wells with a meter of the type described below, indicating that readings with these meters will not be more than 4 per cent off. The meter consists of a scroll or helix designed to get the correct speed and power for effectively registering flow at different positions of the well valve; a governor or stabilizer to retard the speed of drive when the valve is wide open; a drive shaft connecting the two extremities of the unit; and the gear train and registering face.

The governor has wings which rise to right angles with the drive shaft when the speed of the unit is increased, as by opening the well valve. The wings cause sufficient friction to decrease the speed, and as the flow decreases the wings drop back into the governor housing.

Regulations in drilling new wells

In addition to the various phases of conserving water leaving the artesian basin in wells already drilled, careful attention has been given of late to regulations governing the bringing in of new wells. The well inspector, a state official, visits the drilling at various times as each new well is put down, and is always on hand to see that the casing is properly seated in the limestone caprock and that the casing and caprock are properly cemented together. Careful cementing of casings has been found necessary to avoid leakage around the outside of the casing where it is seated in the caprock, which would involve serious water losses. This cementing operation involves the pumping of cement under pressure into the hole to fill any possible crevices around the end of the casing seated in the caprock. After this cement has set, the hole is then drilled into the artesian aquifers for production.

Progress in the conservation of underground waters of New Mexico, largely in the Roswell artesian basin, began with the passage of a state law in 1905 governing the waste of artesian water and requiring that wells be fitted with control valves. In 1909 this regulatory act was amended to stipulate the weight of casing that could be used in artesian wells under certain conditions.

In 1925 the U. S. Geological Survey was engaged to make a complete survey of the water supply of the Roswell artesian basin. As the result of this study laws were passed requiring the bonding of well drillers and placing the control of the basin in the hands of the county commissioners. Two years later the county commissioners were relieved of this responsibility by a statute which declared underground waters whose boundaries could be reasonably defined to be public waters, subject to appropriation and hence under the jurisdiction of the state engineer.

In 1931 errors that made previous legislation unconstitutional were corrected, a conservancy district was formed, and funds were appropriated for the use of this district in plugging leaky abandoned artesian wells. The 1935 legislature added to the existing rules and regulations, particularly as to methods of drilling, weight of pipe required, etc., and gave more power to the state engineer in controlling activities in the var[illegible] artesian districts.

Thus the [illegible]tter has progressed through successive stages to a point where there is a fairly accurate knowledge of just what conditions obtain and how artesian wells may be controlled effectively. Although there is much still to be done, excellent progress has been made in putting a stop to wasteful conditions and practices.

Research Needs Stressed by Railway Engineers

American Railway Engineering Association devotes a large part of its annual meeting to the relation of research to its activities — Committee reports bear chiefly on the pending revision of the association's manual

RESEARCH and revision of the association's manual were the principal topics of discussion at the 37th annual convention of the American Railway Engineering Association held in Chicago, March 10-12. The importance of research was the subject of the presidential address of R. H. Ford at the opening session; it was the background of the talk by Ralph Budd at the association's luncheon meeting; and it was emphasized by Robert Faries, assistant chief engineer, maintenance, the P.R.R., in his talk to the Western Railway Club Thursday evening, which was made a feature of the convention. In the technical sessions the subject came up again in th thought-stimulating reports of Prof. A. N. Talbot and Prof. H. F. Moore on track stress and rail research.

Other than this, the attention of the technical sessions was directed chiefly to revision of the 1929 manual, work that is to be completed as early as possible this year to permit the publication of a new manual.

Manual revision

The old manual was a bound book for which supplements were issued each year containing the revisions approved at the current annual meeting. The new manual is to be in loose-leaf form to permit new or revised matter to be substituted for the old as it is approved. Because of this pending change President Ford, early in the year, instructed each committee to review its subjects in the manual and to be prepared to recommend revisions at this meeting. D. J. Brumley, retired chief engineer of the Chicago Terminal Improvements of the Illinois Central R.R., has been engaged by the association to direct the work of revision.

E. H. Fritch, secretary, reported that the board had appropriated $5,000 for manual revision last March and had spent $4,800. In December the board voted an additional $5,000.

The finances of the association are in good shape, according to Mr. Fritch, $25,300 having been spent and $29,000 received during the year. Membership has remained about constant—1,910 as against 1,903 last year. Registration of members and guests at the meeting exceeded 900.

During the year the association appealed to the Association of American Railroads for funds to conduct studies on boiler-feed water, impact on steel railway bridges and structural welding.

Savings through research

The need for funds with which to conduct research was emphasized by R. H. Ford in his presidential address. The A.A.R., he said, has contributed generously toward the cost of research carried on under the direction of the A.R.E.A., notably the rail research which is being financed jointly by the A.A.R. and the rail manufacturers. About $200,000 has been spent so far.

Funds are needed to carry forward research into the effect of impact on bridges, continuing the studies begun by J. B. Hunley, of the Big Four R.R., reported in Bulletin 380 of the association in October, 1935. Mr. Ford states that Committee 15 estimates that it will require three years to complete the impact study. As indicative of its value to the railroads, Mr. Ford said that the committee estimates an annual saving of $2,000,000 of the $23,000,000 that the railroads spend annually on bridges. Mr. Ford hopes to get a modest annual appropriation from the A.A.R. for this work. Other savings that are possible from research cited by Mr. Ford include not less than $12,000,000 annually through improved methods of conditioning water to make it suitable for boiler purposes. The association also hopes to obtain funds for this study.

Mr. Ford reviewed briefly the work of the track stress committee and stated that as an outgrowth of this study it is hoped soon to inaugurate with the Mechanical Division a joint study of locomotive counterbalancing.

In all this work Mr. Ford expressed himself as in favor of using the laboratory facilities of existing agencies such as the colleges. He is opposed to duplication of facilities, believing that much is to be gained through enlisting the enthusiasm of the engineering students in these problems by letting them have a share in attempts to solve them.

Track stress studies

Dr. Talbot, in his report for the special committee on stresses in track, stated that much work remains to be done in the investigation of rail joints and in the study of the interrelation between track and equipment, as noted previously by Mr. Ford. During the year the test party has been studying stresses in the long stretches of welded rail on the D.&H. R.R. to determine how the influences tending to change the length of the track are met and to find out whether other steps than those now employed are needed to resist these forces. A related question yet to be studied is the effect of the high stresses set up in these long rails upon the development of transverse fissures.

Track

Proposed changes in the manual put forward by the committee on track included an approximate formula for determination of the elevation of the outer rail on curves that gives 3-in. unbalanced speed elevations. The need for so low an unbalanced speed elevation was questioned from the floor of the convention on the basis that there could be a 6-in. unbalanced elevation without discomfort to the passengers.

The track committee also presented a summary of progress to date on the continuous welding of rail in track. With rail as rigidly secured to the ties as is possible with some of the special fastenings that are now available, the committee states that it is possible to weld rails into lengths up to 12,000 ft. without any excessive movement for temperature changes ranging over 175 deg.

Track structure

The importance of track structure in railroad transportation was the subject of the talk of Robert Faries, assistant chief engineer, maintenance, Pennsylvania R.R., before the Western Railway Club meeting at which the A.R.E.A. members were guests. To give his observations concrete form Mr. Faries outlined the studies made by the Pennsylvania R.R. in connection with the introduction of high speed electric service between New York and Washington, commenting on the several elements as he went along. Test devices were installed both on the track and on the locomotive to measure the lateral forces and the concentrations of stress due to shifting loads and to determine critical speeds. These studies, Mr. Faries said, showed the need for further and more elaborate studies of the forces exerted by high speed locomotives. He expressed doubt as to whether it will be possible to develop a more permanent track needing less maintenance and yet having the desired amount of resilience. As evidence of the need for resilience Mr. Faries called attention to the rapid increase in defective brake rigging, in wheels changed because of defects and in rail failures during the past winter when the roadbed of northern roads was frozen to unusual depths.

Life of culverts

The "expected life" of culverts as presented by the committee on roadway

was criticized as being far too optimistic (33 years for corrugated metal pipe, 67 for concrete pipe, 70 for vitrified clay, 81 for cast iron, 92 for concrete boxes and arches, and 151 years for stone masonry). But the committee held its ground, and a motion to refer that part of the report back to the committee was lost. There was criticism also of the specifications for corrugated metal pipe, but these were adopted for inclusion in the new manual, as was a recommendation to adopt the A.S.T.M. specifications for cast-iron culvert pipe in place of those now in the manual.

The subject of culvert life came up again under the discussion of depreciation during the presentation of a report by the committee on records and accounts, when it was stated from the floor that the method outlined by the roadway committee does violence to all accepted principles of computing depreciation. It was then proposed that the record committee's long report on depreciation should be published by the association.

Ballast

New specifications for stone ballast were submitted by the committee on ballast for study by the association. The specifications omit the cementing value test because an exhaustive study of the test method outlined in the 1931 specifications shows it to be valueless. (These studies were fully reported in the committee's printed report.) The new specification will come up for adoption next year. Specifications for blast-furnace slag ballast were adopted for printing in the manual.

Rail

Rail-failure statistics presented annually to the association, for rails in five years' service up to the end of 1934, show that rails rolled in 1929 averaged 121.2 failures per 100 miles of track in 1934, an increase of 44.8 above those of the 1928 rails in 1933 (76.4). This is the highest figure within eleven years, except for 131.3 failures per 100 miles for rails rolled in 1926. Transverse fissures numbered 9,820 in 1934, as against 9,124 in 1933. The accumulated total of transverse fissure to Dec. 31, 1934, is 85,283. An increase in failures due to transverse fissures was recorded in 1934, the first since 1929; it was accompanied by an increase in fissures detected with the detector car.

The rail committee summarized the results of its studies of rail batter and set forth its conclusions and recommendations as how best to prevent batter.

Specifications for heat-treated carbon steel and alloy steel track bolts have been revised in an effort to bring them into harmony with the A.S.T.M. tentative standards. For the same reason the specifications for high-carbon steel joint bars have been revised. The latter call for a tensile strength of 85,000 lb. per sq.in., and the former call for 100,000 lb. (grade 1 carbon steel), 110,000 lb. (grade 2), and 115,000 lb. (alloy steel). Both specifications were adopted.

Rail investigations

Prof. H. F. Moore, research professor of engineering materials at the University of Illinois and head of the rail investigation work being conducted jointly by the A.A.R. and the rail manufacturers, gave another of his informative reviews of the rail studies that has been a feature of recent A.R.E.A. meetings. He characterized the present work as clean-up work supplementing that reported in Bulletin 376 of the association (*ENR*, Sept. 19, 1935, p. 395).

The work done so far has shown quite conclusively that shatter cracks are the genesis of transverse fissures in rails, but Professor Moore added that all shatter cracks do not develop into transverse fissures, hence future study must bear on how to prevent or reduce shatter cracks. Professor Moore is not sure that any one cause can be found for shatter cracks. For a time, he said, it was thought that the high silicon content served as an index of shatter cracks, but this conclusion was upset by a study of rails from a mill that produced rails relatively high in silicon content and yet low in shatter cracks.

Attempts to eliminate shatter cracks by a method of thermal treatment of the rail during cooling, known as normalizing, are giving very satisfactory results. While it cannot be stated definitely that normalizing does eliminate all shatter cracks, it has not been possible to find shatter cracks by etching rail so treated.

Work done since Bulletin 376 was prepared, said Professor Moore, had been directed chiefly to a study of the range of temperatures through which shatter cracks develop. The test party also has reviewed the tests, both destructive and non-destructive, for the determination of shatter cracks in rails. No encouraging results have been obtained in the search for a non-destructive test. Of the destructive tests, Professor Moore now favors the head-down bend test supplemented by etching, but a more sensitive test is being sought.

Tests to determine the relation of low temperatures to the formation of transverse fissures from shatter cracks are still in progress. Another division of the study is related to effect of increased frequency of high wheel loads.

Professor Moore concluded his report by the statement that, even though rail manufacturers might improve their product 100 per cent, railroad men must look forward to rail-fissure failure for at least ten years or until rails manufactured under present methods are all removed from the track.

Railway labor

The committee on railway labor presented an interesting report on out-of-face tie renewals in England, France, Germany and Italy, in which it was stated that the practice has been made practical there as a result of the longer life of ties and better control of mechanical wear secured by the use of relatively large tieplates independently and securely fastened to the tie. The committee stated further that out-of-face surfacing maintenance as practiced in Europe is made practical as a result of having well-drained and compacted roadbeds and track structures of high strength relative to wheel loadings. The committee noted that the practice of out-of-face surfacing at three- or four-year intervals is increasing in this country, and that all tie renewals that should be made prior to the next surfacing are done at that time.

This committee submitted a comprehensive survey of weed killing that should be of interest to highway engineers having similar problems. The committee also presented a summary of recent developments in gang work on major railway-maintenance operations.

Bridge rating

Revised rules for rating existing steel bridges submitted by the committee on iron and steel structures for inclusion in the manual were the subject of considerable discussion, some of the sticklers for form objecting to inclusion of such important material in the manual without giving the association a year in which to consider it. But the practical view prevailed—namely, that these rules were more valuable than the old rules, and the new rules were approved. Included in the rules is a method for precise determination of impact and for determining permissive speeds on old bridges. A formula for track joint effect as one element in a determination of impact was criticised from the floor, to which criticism the chairman replied that its uncertain character was recognized by the committee, but that it was the best that could be produced without the benefit of research.

Highway bridge specifications

The committee on iron and steel structures recommended that the A.R.E.A. specifications for steel highway bridges in the 1929 manual be withdrawn, and that the specifications of the American Association of Highway Officials be used. Note to that effect is to be included in the new manual.

Wooden bridges

New specifications for wood piles were submitted by the committee on wood bridges and trestles. They bring the A.R.E.A., the A.S.T.M., and the A.A.S.H.O. into complete accord on this subject for the first time. Simplified lumber grading rules and classifications that have been developed in collaboration with other organizations were submitted to the association by this committee and were adopted. The same information in

a modified form was submitted last year as information.

To facilitate grade-separation work, the wood bridge committee submitted designs for a wooden overhead highway bridge. It also produced a design for a wooden trestle for heavy loading.

Live load and impact

During the year the association set up a special committee on live load and impact which reported briefly on two subjects. As to a live load for use in designing structures, the committee proposed the use of Cooper's E-72 loading except as specified by the engineer. On impact, the committee included a reference to the report on the subject by J. B. Hunley published in Bulletin 380 of the association last year.

Piledriving

The committee on wood bridges and trestles submitted valuable data on the relationship between energy of hammer and the weight or mass of pile for proper driving, including concrete piles (Bulletin 384). Included was a comparative study of five pile formulas, four in common use and one proposed by the Bureau of Yards and Docks of the Navy but not yet tried out. A bibliography on bearing power of piles prepared by the committee is available from the association in multigraphed form.

Concrete trestles

A design for a concrete trestle using Cooper's E-72 loading and having three-pile bents, the piles being of 24-in. diameter, was submitted by the committee on masonry and adopted. Tentative specifications for composite and pipe columns were submitted for consideration. Similarly recommendations for the design in reinforced concrete of rigid-frame bridges without skew were put forward for comment prior to their formal presentation next year. Other matter submitted as information included specifications for grouting and the design of expansion joints in concrete structures. Specifications for curing concrete, for concrete foundations and for lining tunnels with plain concrete submitted by the committee were adopted.

Tunnels

Information on tunnels also was given in the report of the roadway committee. This included briefed data together with diagrams relating to the Connaught, Moffat, Cascade and Tanna tunnels and a bibliography of articles on tunneling methods and tunnels covering the past 25 years.

Waterproofing

A statement of principles governing the waterproofing and dampproofing of railway structures was submitted to the association last year by a special committee on that subject but was referred back to the committee for further consideration. This year it was introduced again in modified form and adopted. Supplementing it this committee submitted a summary of replies to a questionnaire regarding methods of waterproofing now in use as well as tentative specifications for bituminous emulsions.

Bridge clearances

The subject of bridge clearances came up twice, first under the report on the economic principles involved in clearances over waterways by the waterways committee and second in the report of the committee on clearances. In the former report the procedure followed by the army engineers in studying the effect of waterway projects was set forth in considerable detail. Included was the observation that in computing the savings to be expected from a proposed waterway the army engineers do not take into consideration the collateral costs incurred in building longer or higher bridges nor do they undertake to develop the loss of business that may come to the railways due to construction of the waterway. The waterways committee submitted, and the convention adopted, the statement of principle relating to clearances over waterways that was approved by the Am. Soc. C.E. at its January meeting (*ENR*, Jan. 23, p. 132).

To aid the railroads in determining the cost of building, maintaining and operating bridges over navigable waterways the waterways committee has prepared a questionnaire bringing out all pertinent factors.

The committee on clearances, in presenting a revised set of clearances for publishing in the new manual, included a new diagram for clearances for overhead bridges, abutments, piers, retaining walls and permanent buildings. This diagram was objected to from the floor as arbitrary and too restrictive and was disapproved. Similarly a clearance diagram for railway bridges over highways showing a minimum underclearance of not less than 14 ft., a diagram adopted by the A.A.S.H.O., was disapproved as showing a clearance that was unattainable in many instances and one that would be used against the railroads if approved.

Higher speeds

A new subject for consideration was a report by the committee on economics of railway location on the effect of speeds in excess of 75 miles per hour. The initial report confines itself chiefly to generalities, outlining the elements of track and signal equipment that must be considered in planning for higher speeds and in any determination of their effect. Closely related was a report by the committee on shops and locomotive terminals on changes needed in shops and engine houses to accommodate articulated trains, oil-electric and diesel power units.

Cement-grouted macadam as a material for platforms was the subject of a [illegible] report by the committee on buildings.

New opportunities

Ralph Budd, president of the Chicago, Burlington and Quincy R.R., speaking of the present condition of the railroads and of their future, said that in the drastic reduction of maintenance expenses that has been necessary during the past few years may be found the seeds of opportunity for the railroad engineers. Maintenance expenses can and have been reduced without danger to the track structure, but only a small part of the outlay thus avoided is of a non-recurring nature. Hence there must come a period in which maintenance outlays must rise sharply in order to catch up on the deferred work. Herein, said Mr. Budd, lies the railway maintenance engineer's opportunity to develop better materials, better track and more efficient maintenance and construction equipment. The exhibit of the National Railway Appliances Association held in connection with the A.R.E.A. meeting, Mr. Budd said, was a demonstration that research and development in the railway field had not lagged during the depression.

As further evidence of this progress Mr. Budd cited the improvements in rails, joint bars, and bolts, stating that the normalizing of rails now being employed as a result of extensive research held great promise for removing one of the chief causes of track defects. The rail research that resulted in this development, Mr. Budd said, as well as the intensive studies of the track-stress committee refuted the charge that railroads were not employing research in the manner that other industries employed it. The railroad research problem, he said, is different from that of a manufacturing company. Ideas that originate in the minds of railroad men frequently are developed into practical application outside of the immediate railway organization. For example, Mr. Budd cited the fact that most of the patents held by railway supply houses were originated by railway men.

Regardless of past accomplishments, Mr. Budd stated that the immediate future called for more intensive research, especially coordinated research into track structure financed by the Association of American Railroads and directed by the American Railway Engineering Association. Higher speeds, he said, are bringing new problems and call for more refinement in track structure just as much as in equipment. Finally, Mr. Budd said, the fact should not be overlooked that the track supervisor studying the field effect of a change in track structure was just as much a part of research as was the work of the man in the laboratory. For best results the two must be closely coordinated. Herein lies a field of great usefulness for the A.R.E.A.

Railway show

A display of railroad maintenance and signal equipment was held again this

year in connection with the meetings of the American Railway Engineering Association and the Signal Section of the Association of American Railroads, the National Railway Appliances Association taking the main building of the Coliseum for that purpose. The practice of holding a railway show at the time these two organizations were in session in Chicago was revived last year after a lapse of a few years.

The railway show this year, like that of last year, though smaller than the shows of predepression days, gave unmistakable evidence of the progress in development of railway structures and equipment that has gone on steadily during the past few years. Mechanization of operation which a few years ago were considered to be entirely hand operations is one way in which railroads have been able to keep track in safe condition at a considerable saving of cost over previous years. Changes of this kind in railroad maintenance and construction operations were noted by Ralph Budd, president of the C.B.&Q. Railroad, in his comment to the A.R.E.A. on the progress made despite the depression. Much of this progress has been in refinment of detail. This was evident in the equipment displayed at the show. There were, however, some recent developments such as the use of curved heavy corrugated iron plates to form flat-arch culverts and a display of the method of cement grouting of ballast to stabilize the track structure at crossings.

Letters to the Editor

Proper Use of Puzzolanas

Sir—Mr. Baily Tremper's communication in your issue of Feb. 13, 1936, p. 257, on my article on puzzolanas (*ENR*, Oct. 24, 1935, p. 563) offers an opportunity for some clarification of the intention and general purport of that article. The differences of opinion which he sets forth may possibly be due more to misinterpretation or misunderstanding of statements which were not sufficiently clear than to actual disagreement. The chief point of difference seems to be that Mr. Tremper feels that the article suggests or urges the general use of puzzolanas without much attention to their effects on concrete: this is far from the intention. It had been hoped to show that both field experience and laboratory investigation have demonstrated the value of some puzzolanas, that these advantages should not be neglected, and that in spite of the shortcomings of many of the testing methods, with a more general interest in puzzolanas it would be possible to select and apply suitable members of this class of materials with substantial benefits.

First, with respect to volume change, Mr. Tremper quotes Davis (Kelly, Troxell and Davis, *Journal*, Am. Concr. Inst. Vol. 7, Sept.-Oct., 1935, p. 80). These investigators used only natural puzzolanas, all of rather similar types. The paragraph in which my remarks occur starts with the qualification that volume changes will be reduced "in so far as the puzzolana permits a reduction in water." As McMillan and Powers have pointed out (*Journal*, Am. Concr. Inst. Vol. 5, March-April, 1934, p. 325), any beneficial effects of an admixture, including puzzolanas, must compete with detrimental effects of any increase in water-cement ratio. Davis and coworkers made their shrinkage and other measurements on concretes of equal consistencies, so that with the puzzolanas which they used the water-cement ratio may well have been higher than would have been the case in a similar mix without puzzolana. It might, therefore, be expected that the increase in water-cement ratio would offset advantages which would otherwise be derived from the puzzolana. In our own laboratory, working with puzzolanas which reduced rather than increased the water-cement ratio, we have found reductions in shrinkage and absorption, and increases in resistance to freezing and thawing.

Although there is much disagreement concerning the most suitable methods of testing puzzolanas, these differences of opinion are more on the question of suitable tests to evaluate puzzolanic action from a theoretical point of view. The indiscriminate use of any and all puzzolanas is by no means suggested. It would seem, however, that sufficient information is available to evaluate a puzzolana from a practical point of view. Specifications for such tests have already appeared (specifications for portland-puzzolan cement for Bonneville power-navigation project). Whether such tests measure directly what is theoretically considered puzzolanic action is immaterial. They do measure a useful property of the material described as puzzolanic, and if supplemented by other tests on the effects on water-cement ratio and strength they should permit the selection of a puzzolana that will be definitely beneficial even though it is not possible to explain the mechanism of the action.

It is not quite clear whether the mention of the Los Angeles Aqueduct is criticized because of the suggestion that it was not entirely satisfactory or because it is a poor argument in favor of the use of puzzolana. In the former case, since I could not have had any personal experience with this project, the fault is due to an erroneous gathering of verbal information. In the latter case, the existence of a failure or even a partial failure would hardly constitute a valid condemnation of puzzolanas.

No one would be likely to disagree with the statement of Mr. Periani with respect to the Servola mole and other deteriorated structures. It was far from the intention of the article to recommend the "mere adding of portland cement to ground puzzolana." On the other hand, a wide and successful use of puzzolanas in Europe is attested in many publications. Reference is made to Franklin and Vickers (*Chemistry and Industry*, Vol. 54, No. 11, March 15, 1935, p. 231). References to successful structures abroad in a number of countries are given in a booklet issued by the Santa Cruz Portland Cement Co. The reports of the Building Research Board for recent years contain accounts of successful tests on both natural and artificial puzzolana. P. H. Bates (*Journal*, Am. Concr. Inst., Vol. 6, Jan. Feb. 1935, p. 226) cites successful use in this country.

The statement by Miller and Manson (*Tech. Bull. 358*, U. S. Dept. of Agriculture) that, "Therefore it appears that, regardless of the methods used to determine the active properties of a puzzolana, justification for its use to increase the resistance of a portland-cement concrete must depend upon careful experimentation" is entirely in agreement with the remark in the article that, "Care should be exercised in their selection, to secure materials suitable for the purpose." That suitable materials are available is indicated by the results secured by Miller and Manson, or by Thorvaldson, Vigperson and Wolochow (*Canadian Journal of Research* 1, 385-399, 1929), by our own laboratory.

The article on "The Possibilities of Puzzolanas" endeavored to point out the advantages to be gained from the use of suitable materials but also to show their limitations. It would in no way be desirable to engender uncontrolled enthusiasm, but it would seem equally undesirable to fail to profit by the benefits of available puzzolanas, always provided that due care is exercised in their testing. Because there is no direct correlation between accelerated freezing and thawing tests and normal exposure, as seems to be the case, this is hardly a good reason for neglecting measures which will produce resistance to the laboratory test. Equally, the lack of a single test to permit the evaluation of puzzolanic activity should not preclude the use of puzzolanic materials if they are tested, as suggested by McMillan and Powers for their effect "on strength, workability, volume change, resistance to disintegration by freezing and thawing, and resistance to the action of strong sulphate waters."

EDW. W. SCRIPTURE
Director, Master Builders Research Laboratories.
Cleveland, Ohio.
Feb. 21, 1936.

ENGINEERING NEWS-RECORD

Volume 116, No. 12.

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Editorial and Publishing Offices at 330 West 42d Street, New York

March 19, 1936

Not Keeping Faith

THE UNDERTAKING of an $11,000,000 program of dock construction and repair in New York City by the WPA is a case of flagrant disregard of the intent of the Works Relief Act and of the president's executive order of last July defining the limits of WPA work as projects under $25,000. The essential part of the dock program is the demolition of nineteen old piers and the building of twelve modern structures. Such a plan cannot be considered as anything except a major construction project requiring the skill, experience and equipment of able dockbuilding contractors. The General Contractors' Association of New York rightfully protested to the President the undertaking of this work by the WPA. Designed and supervised by the city's dock department, the improvement will become a revenue-producer for the city through rentals, and clearly falls within the class of self-liquidating projects. The administration gave assurance that the Relief Works program would not compete with private industry, and that contractors and other established agencies would be given proper consideration. The President will break faith with the construction industry if he allows the New York dock project to proceed as now planned.

Congress Says No

JUDGING by the Senate's rejection of an appropriation for the Florida Canal, the national legislature is reassuming its responsibility for major improvement projects and will hereafter refuse to allow such projects to be decided by executive fiat. This is a gratifying forward step. Orderly government by representative processes is incompatible with abdication of legislative authority over great works projects, especially where the economic or welfare value of the project is so much in question as in the case of the Quoddy tide-power project and the Florida Canal. When the four-billion-dollar relief works act was written, no one thought that it was meant to support any such undertakings; but its vague terms and extensive grant of power to the executive department permitted their initiation, to the loss of hundreds of needed local betterments all over the country that would have provided widely distributed employment. If the principle of legislative control is to be maintained consistently, it will be essential that any new relief appropriation be so clearly defined as to uses and methods that Quoddies and Florida Canals will become impossible.

Highwater and Flood

BY ONE of those amazing contradictions with which nature often confronts us we are told at the same time of dust storms in the heart of the dry farming country of the Great Plains and widespread floods in the East. At the moment the latter have first claim to attention. Their severity in some regions, as in Central Pennsylvania, well warrants the President's prompt action in providing for the fullest possible federal aid. On the other hand, not every case of high water can rightfully be called a "flood disaster," and at least some of the losses being reported are the result of human heedlessness. Men who build houses on low-lying river banks must expect to have spring freshets rise above their doorsteps. The distinction between highwater and flood must be kept carefully in mind if flood-control planning is to go forward soundly. Variation of river flow is both natural and desirable; spring freshets are valuable flushing and channel-clearing agencies. In addition, it will never be possible, even were it worth while, to control every river and brook to the point of complete equalization of flow. A vast majority of our streams will and should continue to have their spring highwaters, and until the public insists that selfish individuals shall not be allowed to obstruct highwater channels we will have yearly "flood" accounts.

A Question of Application

AN INITIAL STEP toward formal coordination of federal water-resource activities is made by the President's order of Feb. 4 establishing the National Resources Committee as a clearing-house for government drainage and water storage. Informal coordination through spontaneous exchange of information by the various bureaus concerned has long existed, but a recent study by a special subcommittee of the National Resources Committee indicated that this informal procedure was not wholly successful. The subcommittee's recommendation that the National Resources Committee be set up as central authority over such water projects does not appear to have been accepted by the President, since his order limits the coordination to exchange of information. How useful this kind of coordination will prove depends on the wisdom with which it is carried out. Not all conflicting objectives can be harmonized. A bureau that for economic development undertakes to drain a swamp cannot well compromise with a bureau that desires to perpetuate the swamp as a hunter's paradise. On the other hand, stream development operations should whenever possible consider navigation, water supply, flood protection and preservation of underground water resources as combined objectives, and if the new clearing-house system helps to bring about such broad study it will be of value.

To Stop Brigandage

NEW JERSEY politico-legislative brigands, after taking the bulk of road-tax moneys away from their dedicated purpose, have an opportunity for still further diversion of road taxes to make up for their lack of courage in adopting legislation for unemployment relief. Last week they took the three millions that were left in the state road fund, but there is a chance to steal $2,800,000 more—money that has been allotted to counties and towns for aid in financing secondary and land-service road improvement. If reports from the state legislative chambers are true, this handy sum has not been forgotten by the diversionists, and they only wait reorganization of their forces before undertaking the raid; but the people of the state ought to be told that this diversion can at most postpone for only a few weeks the levy of relief taxes. But, though merited, castigating the legislature of New Jersey or that of any other road-tax-raiding state does not meet the situation. The fundamental fault

is that no state has a constitution for the administration of the growing public business of highway transport. As stated elsewhere in this issue, such a constitution has for the first time been written by a legislative commission for New York State. It sets an example that every state should follow. Until there is such fundamental law and policy, present conditions in New Jersey will be mirrored in every state when sufficient financial pressure arises.

Railroad Research

RAILROAD RESEARCH was strongly emphasized at the annual meeting of the American Railway Engineering Association last week. The railroads, said Ralph Budd, have been sharply criticized for failure to apply research to their problems as other large corporations have done; though this charge is not borne out by the facts, yet, he said, the need for continued and expanded research has increased greatly in the last few years. Similar views were expressed by R. H. Ford, president of the association.

Research problems of the railroads are widely varied, and many are peculiar to that field. Hitherto research has been conducted largely by individual railroads, or by organizations like the Association of American Railroads and the American Railway Engineering Association, cooperating with manufacturers of railroad equipment and materials or with the research departments of colleges. Notable examples are the classic studies into track stresses conducted under the direction of A. N. Talbot at the University of Illinois, and the more recent rail-fissure studies under H. F. Moore. Because of the present need for more intensive research it has been suggested that the railroads set up an independent research agency under the A.A.R.

Such a change in policy appears unfortunate, and this for two reasons: First, the colleges have ample research facilities available and are in need of research work of a non-competitive nature. Second, research work on railroad problems by students while in training or during vacations would interest them in those problems and in railroad work as a field of opportunity, and so would bring to the railroads the very type of young men that they most need. As Mr. Ford put it, "The transportation industry is not greatly in need of new captains and generals, but there always is a definite need for material from which captains and generals of the future can be developed. It is from the reserves of qualified youth, trained largely in our technical schools, that the rail industry must draw if it is to reap benefit from progress in the arts and sciences." In the days of active railroad expansion a large percentage of engineering graduates began their active career in railroad work, and from these men the railroads drew heavily for their permanent staff. Today the situation is much different. If research work in schools will in some measure restore that contact, it should be stimulated even though it brings no return in dollars and cents.

Past experience has shown, however, that the cash return from research is large. It is estimated, for example, on the basis of savings already made possible by research, that annual savings of $12,000,000 should be possible through further improvement in methods of treating water for boiler purposes. Still greater savings in rail expenditures appear possible from what has already been learned in the rail research. All of which cannot but raise question as to whether savings of this kind are not more real and more easily attainable than some of the possible savings through consolidation and regrouping.

A Constitution for the Road

THE comprehensive program for putting the roads of the state into shape worked out by the New York legislative commission which has just reported makes an important contribution to sound public administration. It is certain to receive wide study, for it concerns every citizen in his own affairs as well as in his relation to good government. Its merit will be recognized by all who appreciate the complex problems involved in keeping up that essential of human communication, our road system.

Detailed proposals are made in the report for modernizing current practices of road management. Numerous problems that now are imperfectly dealt with will be placed on a sound, sane and practical basis if the proposals are adopted. Taken as a whole, the recommended program writes a new constitution for the administration of the road network, a constitution basic in character yet flexible enough to permit of meeting any probable change in requirements.

It is timely to recall some of the difficulties of the existing system. Our main-road network, still incomplete, is being developed by haphazard action rather than by systematic plan—because of uncertain finances and the absence of a basic program. The auxiliary network of town and country roads, on the other hand, imposes a vaguely defined but serious burden on the local government units, as a result of which these roads are largely useless as travel routes. Road hazards steadily increase, while road efficiency as steadily decreases. The risk of night travel and the danger to the pedestrian continue without amelioration. Maintaining the roads and keeping them open in winter months become ever more difficult and burdensome. And, not least, much of the taxpayers' money is wasted through the inefficiency of random, piecemeal expenditure.

These are some of the shortcomings of the present system. The definite state program outlined in the report gives high promise of correcting them. Its plan and underlying philosophy rest on the secure foundation of broad-gage surveys of road use and a statewide canvass of road condition; therefore, the report has all the authority that attaches to adequate information.

Three elements of the program invite attention: *First*, and most important, is the careful appraisal of the size of the job to be done and its proper distribution to state, county, town and city; a necessary corollary is increased aid to the local governments. *Second* is an adequate financing plan, making possible a purposeful, stabilized procedure. *Third* is provision for those essentials of road modernization—lighting and sidewalks. Associated features of major importance are better care of highway routes through cities, of bypass roads and parkways, and of grade-crossings—problems that in themselves would justify a comprehensive state program.

Thus a new future for our road development is opened up by the commission's report. It promises to be of profit to everyone; its cost is placed where it logically should be borne and will be borne cheerfully—namely, on the road user. The public at large as well as those who have special concern with road problems will look hopefully to its early adoption and realization.

CURRENT NEWS

Coordinated Plans For Water Storage

President instructs agencies to inform National Resources Committee of water storage plans

A REPORT, on the coordination, or lack of it, existing between the drainage and water storage plans of various federal agencies, made by the sub-committee of the Water Resources Committee on an order from President Roosevelt, recommended that the National Resources Committee be given authority to serve as a clearing house of information and opinion concerning proposed federal drainage and water storage programs. Shortly after receiving the report, the President requested that all federal agencies concerned with the projects, or with allotments, for land drainage or storage submit a statement of such a program to the National Resources Committee at regular intervals in order that other agencies having interest in the work may be informed by the committee of the programs in advance.

The report found that conflicts of federal activity in drainage work, resulting in unnecessary waste and delay, have occurred, and that the number of such conflicts may be expected to increase as a result of recent extensions of federal authority over drainage work; it also points out that all but a few of the conflicts might have been prevented had there been opportunity for reconciliation of policies during the planning of the various programs. The report recommends an administrative mechanism for promoting balanced consideration of proposed federal projects.

The administrative control which was recommended requires authority for the National Resources Committee to serve as a clearing house of information and a provision by the National Resources Committee of personnel to staff the suggested sub-committee which would review programs. It is recommended that a continuing committee presided over by someone recommended by the Water Resources Committee, be made up of representatives of the federal agencies to formulate policies. Controversies would be referred to the Water Resources Committee for adjustment.

In his memorandum to the various federal agencies, President Roosevelt pointed out that the investigation made by the National Resources Committee showed that unnecessary waste and delay in the execution of land drainage and water storage projects resulted from the failure of the agencies to secure a review of the projects from all relevant points of view while the work was being planned. He also pointed out that some ill-advised projects might be undertaken if such a review were not made. No indication that the National Resources Committee would be vested with the authority asked was evidenced in the President's memorandum which said:

"Please instruct appropriate officials of your agency to submit a statement of impending programs involving land drainage or water storage to the National Resources Committee at regular intervals in order that other agencies having an interest in the work may be informed by the committee of their programs well in advance of their initiation."

The sub-committee was composed of the following: W. B. Bell, Bureau of Biological Survey; Lieut.-Col. G. E. Edgerton, Corps of Engineers; Perry Fellows, Works Progress Administration; Elmer Higgins, Bureau of Fisheries; S. H. McCrory, Bureau of Agricultural Engineering; S. A. Rohwer, Bureau of Entomology and Plant Quarantine; P. I. Taylor, Bureau of Reclamation; L. L. Williams, U. S. Public Health Service; and Abel Wolman, Chairman of the Water Resources Committee, who also served as chairman of the sub-committee.

New Method Developed for Stimulating House Building

Washington Correspondence

Weeks of squabbling on the administration's housing bill seem to be about over. Provisions to stimulate private construction, (*ENR*, March 5, 1936, p. 363), which carry the most weight in the drive to overcome the home shortage, have been held up pending agreement on a method of subsidizing public housing that does not require cash. This apparently has been arrived at in a plan which accepts the land plus tax exemption as the contribution of local housing authorities and relieves the federal government of having to pay any money down.

Cost of construction would be raised in the first instance by mortgaging the property to the RFC Mortgage Company or to a national mortgage association formed under the National Housing Act, that would issue bonds against the loan for public investment. To the extent that rents collected from a project fail to cover cost of operation, maintenance and amortization, the deficit would be covered by the federal government whose contribution, payable at the rate of $3 or $4 per room per month, is estimated as roughly equivalent to the local contribution in the form of tax exemption.

This scheme was devised primarily to pacify the aggressive rooters for public housing without committing the federal government to any big outlay this year. It has behind it no sincere conviction that it will result in much construction.

Still in dispute this week was the question whether PWA should be allowed to continue construction of further "demonstration" projects. Ickes and the public housers are putting up a tough scrap, contending that it will be many months before local housing authorities get under way. It is expected that Ickes will be permitted to go ahead in a small way if he can scrape up the money out of previous appropriations for public works.

Florida Canal Funds Voted Down

New amendment is passed, however, providing funds for three other projects previously defeated in Congress.

AN APPROPRIATION of $20,000,000 to continue construction on the Florida Canal and three other projects undertaken with emergency funds, but not authorized by Congress, was voted down by the Senate 34 to 39 on March 17. The vote was taken on the Fletcher Amendment to the Army Appropriation Bill and would have provided $12,000,000 for the Florida Canal, $3,500,000 for Conchas Dam, N. M.; $2,500,000 for Sardis Reservoir, Miss., and $2,000,000 for Bluestone Reservoir, W. Va.

Following defeat of the Fletcher Amendment, the Senate approved by a vote of 36 to 27 an amendment offered by Senators Hatch, of New Mexico and Neely, of West Virginia, appropriating $8,000,000 for the Sardis, Conchas and Bluestone projects. These projects previously had been rejected by the House and by the Senate Appropriations Committee. The Passamaquoddy power project was not included in the Fletcher Amendment and no provision is made for it elsewhere.

The Fletcher Amendment had survived a point of order raised in the Senate March 16 by Senators Copeland, Clark, Vandenberg and others who argued that Senate rules do not permit appropriation for projects not previously authorized.

The authorization bill is still pending in a subcommittee, of the Commerce Committee, comprising Fletcher, Copeland and Vandenberg. Two days of debate in the Senate revealed hostile sentiment against permitting President Roosevelt to undertake, with emergency funds, projects not previously authorized, that cannot be completed without further appropriation.

The Senate's action forecasts adoption of a limitation to this effect in the forthcoming Emergency Relief Appropriation Bill.

Study of Reclamation Projects Included in New Bills

Creation of a commission to study the economic conditions of the various federal reclamation projects is proposed in a bill reported favorably by the Senate Committee on Irrigation and Reclamation. The bill also extends the deferment of payment of water right charges for the year 1936. Rep. Terry, of Arkansas, has introduced a bill authorizing the construction of thirteen reservoirs on the Arkansas and White Rivers at a cost of $126,719,000. The Committee on Public Lands and Surveys of the Senate has reported favorably the bill withdrawing from entry certain public lands in the Santa Barbara national forest for the purpose of protecting the water supply of the water sheds of Santa Barbara County. The bill passed the House June 3. Rep.

Dempsey, of New Mexico, has introduced a bill authorizing Rio Grande canalization from Caballo Dam to El Paso, with the proviso that the diversion dam and canalization works are not to cost in excess of $4,000,000. Creation of a marine investigation board to report on all marine accidents involving loss of life either at sea or in the air is proposed by Senator Gibson of Vermont. Senators Bone and Schwellenbach of the State of Washington, have introduced a bill specifying the details of how surplus electrical energy at the Bonneville project will be distributed. Improvement of Schuylkill River between Fairmount dam and Schuylkill Haven is provided for in a bill introduced by Rep. Ditter of Pennsylvania.

Cotton Highway Fabric Made Available to States

An allocation of $1,300,000 has been approved by Secretary of Agriculture Wallace to stimulate field tests of new uses of cotton in highway construction. Cotton fabrics for use as a reinforcing membrane in bituminous surface treated highways and for cotton mats for use in curing concrete highways will be furnished upon request to state highway department so that they may be tested in widespread use under all climatic conditions. It is expected that if the results of these tests are as favorable as certain preliminary trials along these lines have indicated, these new fields of use would require large quantities of cotton in the future.

Under the program as approved, cotton fabric for bituminous surfaced roads will be provided for a maximum of 1,000 miles of road. About 80,000 cotton mats for curing concrete in highway construction will be made available for an average of at least three projects in each state. The project will be administered jointly by the Bureau of Public Roads and the Agricultural Adjustment Administration.

Experimental work in the development of cotton mats for curing concrete has shown the mats to be satisfactory and economical for this purpose. Coarse cotton fabric as a reinforcement membrane in bituminous surfaced roads has been tested for a number of years in South Carolina and some experimental projects have been undertaken in other states. It is felt that the only way of determining exactly that the use of the fabric will prove economical is to try it out under widely varying conditions in large amounts.

Floods Do Widespread Damage In Many Eastern States

Johnstown, Pa., swept by flood reminiscent of that of 1889—Large railroad bridge in Maine carried away—High water does extensive damage over wide area in United States and Canada

HEAVY RAINS following several days of mild weather and coming at a time when the ground was still frozen and covered with snow and when the ice had not moved out of many rivers in the Eastern and North Central sections of the United States caused widespread inundation last week and in some places severely damaged railroads, highways and many bridges.

President Roosevelt, on March 18, named an emergency flood committee with wide powers consisting of Secretary of War Dern, chairman, Acting Secretary of Navy, Rear Admiral Andrews and Adminstrators Hopkins and Fechner.

New floods in Pennsylvania

As we go to press reports from western Pennsylvania indicate that threat of extreme flood in that region has been brought by further rains. Many streams in that area are reported to be higher than they have been in 40 years.

Johnstown, Pa., scene of the great flood of 1889, on Wednesday reported that a steady rain that did not end until early morning had raised the Conemaugh River to the point where some streets were flooded to a depth of 14 ft. Cumberland, Md., similarly reported that a rise in the Potomac and in Wills Creek had brought water twelve feet deep into the streets of the town. From Indiana, Pa., the Associated Press reports the loss of four lives due to the failure of a dam in a narrow valley above the town. At Pittsburgh, Pa., the Ohio on Wednesday reached 17.5 ft. above flood stage putting the water and power systems out of service.

Wide damage in Maine

The Maine Central Railroad reports that four 108-ft. spans of a steel bridge over the Androscoggin River near Brunswick, Maine, on one of the main lines between Portland and Bangor were washed away by the floods and the ice. No estimates of the flood damage is available yet, but is expected to be heavy. Service between Portland and Bangor and all points east is being maintained by the Maine Central's other Bangor-Portland route via Lewiston with trains stopping at Winthrop enroute and buses of the Maine Central Transportation Co. furnishing connecting service to Augusta, Gardiner, and Richmond.

The spans of the bridge across the Androscoggin were pushed off the piers by ice and water. The flood had not abated enough on March 17 to permit examination of piers.

Ice jams on the Kennebec River flooded sections of Gardiner, Hallowell and Augusta. Damage in the Kennebec Valley alone was unofficially estimated as being $1,500,000.

Landslides in New Hampshire

In New Hampshire highway damage was estimated at $250,000 due to landslides in a number of places, among which were Gorham and Crawford Notch in the White Mountains. At Glen the Saco River flooded a number of houses and resulted in one death. Throughout the Merrimac Valley bridges were damaged, train service disrupted and plants flooded. The Connecticut River forming the boundary between Vermont and New Hampshire threatened for a time to become as destructive as it was during the disastrous 1927 flood, but damage was confined chiefly to inundation of highways and railroads, halting traffic in a number of places. St. Johnsbury, Vt., on the Connecticut River, was flooded to about the same extent as it was in 1927. Conditions in the Williams River valley in Vermont were about the same as those along the Connecticut. At Chester the Rutland Railroad tracks were washed away.

A record high water mark of 43.9 ft. was reported at Lawrence, Mass., on the Merrimac River, which flooded innumerable plants causing shut-downs and damage to plants and goods. Near Great Barrington in the western part of the state the tracks of the New Haven Railroad's line were

RAILROADS suffered heavily in the floods of last week. These pictures show, at the left, a train derailed by a washout near Hamburg, N. J., and at the right a small bridge between Bellows Falls and Chester, Vt., undermined and swept away.

undermined by the Housatonic, causing a derailment injuring several persons. At Athol, the Millers River carried away part of a factory, and highways throughout the state were inundated.

The Connecticut River at Hartford, Conn., had reached a height of 23.8 ft. and caused considerable flooding in the low-land area of East Hartford. An old covered bridge across the Housatonic at Cornwall was carried away and the Naugatuck River Valley was flooded in many places with highways covered by ice.

Ice troubles on the Hudson

Ice jamming in the Hudson River caused considerable flooding in the lower parts of the cities along its banks. Ice was piled on the main line tracks of the New York Central Railroad where it runs along the Hudson at Stuyvesant, and trains were routed over the Boston & Albany Railroad. In other parts of the state as at Cold Springs land slides closed the highways. At Utica and vicinity the Mohawk River flooded roads and at Corning the Conhocton River carried away bridges. Enfield Creek at Ithaca also washed out bridges and the Ramapo River at Suffern broke through a dike protecting the sewage disposal plant.

A train on the New York, Susquehanna and Western Division of the Erie Railroad was wrecked in Suffolk County, N. J., as it ran into a washout. Throughout the whole Passaic Valley considerable damage was done to roads, houses and factories. Water rose almost to the second floor of a number of factories in Paterson.

The Delaware at Riegelsville was 6 ft. below the 1903 flood level but ice conditions were worse, necessitating the closing of three bridges. One pier of the 100-yr. old bridge at Riegelsville is about gone.

Throughout Pennsylvania, especially along the Allegheny, Monongahela, Ohio and Susquehanna Rivers the streams were high before the rains of Tuesday. At Shippensburg a small dam broke, flooding the town. In the Harrisburg and Wilkes Barre regions extensive overflow did considerable damage to highways and towns. At Conowingo, Md., the Susquehanna River inundated several roads.

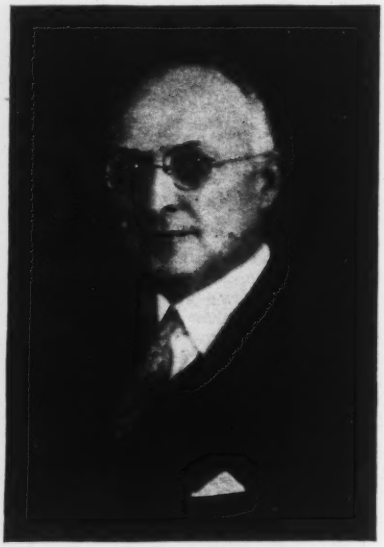
At Sioux City, Iowa, 100 square blocks in the residential area were flooded and the Platte River did considerable damage to highways throughout its valley. The Mississippi River has been rising slowly during the past week without flood stages being reached. Tributaries of the Mississippi in the Rock Island, Illinois, district were still rising on March 14, but no extreme high water had been recorded.

A rapid thaw following heavy snowstorms caused much damage in the east of Canada, doing $100,000 worth of damage at the town of Port Hope, on Lake Ontario, as the Generaska River broke through its banks and a small dam gave way and washed out a number of bridges. A Canadian Pacific branch line was washed out near Coburg and trains from Montreal to Toronto had to be rerouted owing to flooding of tracks. Among the hardest hit of the towns and villages was Belleville, Ont., which had its main street flooded to a depth of 5 ft. More than 300 were made homeless and a food shortage threatened. This is reported to be the worst flood in 20 years, and property damage is estimated at $500,000.

At least half a million dollars worth of damage has been done in the Annapolis Valley of Nova Scotia to railroad, highway, and orchard property. Suffering the most complete tie-up in its history, the Dominion Atlantic Railway (serving the west coast of Nova Scotia) was at a standstill for almost two days. No lives were lost, but serious damage has been done to tracks and the valuable orchards of this famous valley.

A. R. Wilson Elected Head Of Railway Engineers

A. R. Wilson, engineer of bridges and buildings, Pennsylvania R.R., Philadelphia, Pa., was elected president of the American Railway Engineering Association at its annual meeting held in Chicago March 10-12. He succeeds R. H. Ford, assistant



A. R. Wilson

chief engineer of the Chicago, Rock Island and Pacific R.R. Mr. Wilson has served as a vice-president of the association since 1934.

The other officers elected were: F. E. Morrow, chief engineer, Chicago & Western Indiana R.R., second vice president; H. R. Clarke, engineer maintenance of way, Chicago, Burlington & Quincy Ry., F. L. C. Bond, general superintendent, central region Canadian National Ry., and W. M. Post, assistant chief signal engineer, Pennsylvania R.R., directors. J. C. Irwin, valuation engineer, Boston & Albany R.R. becomes first vice president automatically. E. H. Fritch was reelected secretary.

Short Course Offered for Sewage Plant Operators

The second annual short course for water and sewage plant operators sponsored by the Pennsylvania Sewage Works Association and the Pennsylvania Water Works Operators Association, will be held at the Pennsylvania State College from March 30 to April 4. These courses are given by the department of civil engineering of the Pennsylvania State College.

Silicosis Studied In WPA Survey

Silicosis compensation laws in New York and Connecticut under fire, as New York state hearings are being held.

GROUPS representing labor, industry, and the state combined in favor of reducing compensation benefits for silicosis sufferers in an appeal made at a public hearing on March 12, before the Assembly Committee on Labor of the New York legislature. The recommendations were made in the open meeting by Mark Daly, representing the Associated Industries of New York State; George F. Meany, President of the State Federation of Labor; and Elmer F. Andrews, Industrial Commissioner. The groups appealed for what they termed "relief from the burden silicosis has put on industry in New York State."

Commissioner Andrews reported that industry generally favored inclusion of silicosis as a compensable disease under the workmen's compensation law since it would eliminate civil suits by employees. He stated also that enactment of legislation designed to cut down silicosis benefits would tend to prevent closing down of plants or their possible removal to other states which have no compensation law coverage for such diseases. At present a sufferer may receive as high as $25 per week maximum compensation benefit.

Connecticut law criticized

Connecticut authorities are defending the state silicosis law which has been openly criticised by Verne A. Zimmer, director of the Federal Bureau of Labor Standards. Mr. Zimmer has declared that the Connecticut law does not afford adequate protection and is unfair to both workmen and employers. The law, he says, makes no special provision for silicosis and cannot compensate for this disease amply.

The Connecticut compensation law was adopted by the Connecticut Assembly in 1913, and was largely the work of Attorney Cornelius J. Danaher, who points out that the law is recognized as one of the best and most liberal of its kind in the United States.

Mr. Zimmer says workmen can be employed for years in silica-laden atmosphere and be discharged without showing any symptoms of the disease, only to have silicosis disable them later. The Connecticut law has been changed to meet this point declares Attorney Danaher.

WPA studies industrial health

Two Works Progress Administration industrial research projects are being carried on near Boston, Mass., with a view to safeguarding the health of thousands of workers in many industries throughout the United States by eliminating or curtailing effects of silica dust and certain chemicals, according to Administrator Hopkins. Mr. Hopkins explained that the silicosis study under the direction of Manfred Bowditch, director of the Massachusetts Division of Occupational Hygiene, is being carried on chiefly in connection with the extensive granite industry in Massachusetts, and is being done by WPA technicians.

The Occupational Hygiene director asserted that it is not, of course, possible to eliminate the silica dust itself. It is unavoidably present in many industries.

Washington Highlights

By Paul Wooton

The Supreme Court has approved the findings of the special master in the original suit between Michigan and Wisconsin over the boundary between the two states in the Menominee River. The states were ordered to divide the expenses.

An inquiry into means of increasing capacity of the Panama Canal was authorized in a resolution passed by the House and referred to the Senate on March 16. The investigation, endorsed by Secretary of War Dern, would be conducted by the governor of the Canal Zone.

Asked whether investigation of alleged irregularities on the Buffalo sewer project had presented any cause for action, Administrator Ickes replied that he had nothing to say.

Commenting on the charge of seven Texas utility companies seeking to enjoin construction of the Lower Colorado and Brazos River projects that flood control and irrigation are only a sham to cover power development, Administrator Ickes said that flood control is the primary purpose, that incidentally there may be some power development but that under the Supreme Court's TVA decision, as he understands it, that is perfectly permissible.

Cancellation of a $4,000,000 PWA allotment for construction of the projected Baton Rouge bridge across the Mississippi River released funds that went to make up the $33,500,000 grant and loan for highway construction in Mississippi. The bridge was included with other PWA projects in Louisiana that were suspended last year.

Because PWA regulations covering local construction projects were not complied with in building a municipal power plant at Burlington, Kan., a federal grant of $41,300 to cover 30 per cent of the cost of labor and materials from the original public works fund has been revoked.

PWA Will not Assume Added Labor Costs

PWA will not recognize any increase in wage rates resulting from the present strike on its three housing projects in Cleveland as warranting an increase in the price paid to the contractors. WPA's position is that under their fixed price contracts, George A. Fuller & Co., contractors on the Cedar-Central and Outhwaite projects, and Madsen Construction Co., on the West Side project, must pay the added cost out of their own pockets. It is estimated that the increased rates demanded by the unions will increase the cost of each project by approximately $100,000.

The contracts provide for the payment of prevailing rates. The original agreement was permitted to lapse but its rates were adhered to until the unions set up a new schedule several weeks ago. At the request of Administrator Ickes, Dr. John Lapp, of the Petroleum Labor Relations Board, is attempting to negotiate a new agreement. Administrator Ickes said that contractors on PWA projects in St. Louis also will have to bear any increase in wage rates resulting from strikes in that territory.

Preparing for San Francisco's World Fair

Progress on the Bridge Exposition at San Francisco, scheduled for the period from Feb. 18, 1939, to Dec. 2, 1939, is shown in this airplane picture of filling operations on the exposition site—shoal land just north of Yerba Buena Island and adjacent to the new Bay Bridge. An area of 5,500 x 3,400 ft. is to be reclaimed and will require about 19,000,000 cu. yd. of dredged fill enclosed by a rock sea wall. The exposition is to cost $25,000,000, of which $6,250,000 is to be advanced in federal grants. U. S. Army dredges started work on Feb. 11 and by March 11 had placed 945,000 cu. yd. of the fill. As soon as bids can be received the dredging is to be done by contract under supervision of the Army Engineers.

New York Contractors Protest WPA Dock-Building Program

The start of an $11,000,000 program of dock construction and repair by WPA in New York City was protested by the General Contractors Association of New York in a telegram to President Roosevelt on March 9. The association alleges that the President's executive order of last July 3, in which WPA projects were limited in size to $25,000, is being violated, and asks the President to issue instructions that the work be done by contractors' forces. The largest project in the program calls for demolition of nineteen old piers to be replaced by twelve modern structures providing wider docking slips of sufficient length to accommodate present-day ships. Principal work will be along the Hudson River waterfront between 23rd and 45th Sts.; other projects are planned at 70th St., and at Staten Island.

Prior to sending of the telegram George J. Atwell, president of the contractors' association, in a conference with President Roosevelt suggested that some plan of use of contractors' forces, as provided for in executive order covering relief work procedure, should be put into effect.

The full text of the telegram to the President follows:

"A meeting was held today attended by a large number of representative dock-building contractors in the metropolitan area to protest against expenditure of $11,000,000 by the Works Progress Administration in the City of New York for construction and repairs of docks sponsored by the City of New York as outlined in statement issued by Mr. Ridder (local WPA administrator) in the press under date of March 4. It is our belief that such program is in conflict with your statement of July 3, 1935, and that such projects do not properly come within the jurisdiction of the Works Progress Administration being in excess of $25,000. In view of the fact that plans for these projects have been prepared by the Dock Department of the City of New York we believe that this work should be done by competent contractors skilled in this particular line of work. We therefore respectfully urge that instructions be issued to this effect."

The association reported that up to late Tuesday, Mar. 17, no reply had been received from Washington or from the local WPA offices.

Architects Form Group for Low Cost House Planning

In accord with the recommendations by the American Institute of Architects, a group of about twenty New York architects has formed the Small House Associates to offer, at minimum fees, architectural service on homes costing between $3,500 and $8,000. Member architects will submit sketches or plans for a portfolio from which a prospective builder may select a sketch. He is then referred to the architect who made the sketch and the general plans are then modified to suit the individual needs. As the membership in the bureau is not closed it is expected that other architects will submit plans to the bureau.

The executive committee is composed of Harrison Gill, Frederick Woodbridge and Geoffrey Platt. Alfred E. Poor is treasurer, while Harvey Stevenson, Gerald A. Holmes and Edgar I. Williams are members of the design committee.

New York Flood Commission To Request $35,000,000

Preparatory to requesting $35,000,000 for flood control in New York and Pennsylvania areas, a delegation representing the New York Flood Control Commission called upon Maj. Gen. Markham, Chief of Engineers, to inquire whether he had been informed of a letter addressed by President Roosevelt to the Binghamton, N. Y., Chamber of Commerce in which he agreed, with reference to these projects, to alter the usual course of engineering reports. Instead of being submitted to Congress directly by Secretary Dern, the report of the Corps of Engineers will first be inspected by the White House. The delegation was informed by General Markham that he is aware of the President's letter and that it would be respected.

The New York Flood Control Commission, appointed in accord with a recent law passed by the state legislature, met in Albany on Feb. 28 and organized with Senator Ogden J. Ross as chairman. The committee, consisting of thirteen persons, is to cooperate with the federal government in a long-range program for flood control in New York State. The legislation creating the committee came as a result of the serious damage done in New York state last July. It is expected that the committee will confer with the Corps of Engineers in an effort to develop a comprehensive program for the area. A survey of the counties affected was undertaken by the Army engineers.

Stream Pollution Bill Hearing To Begin This Month

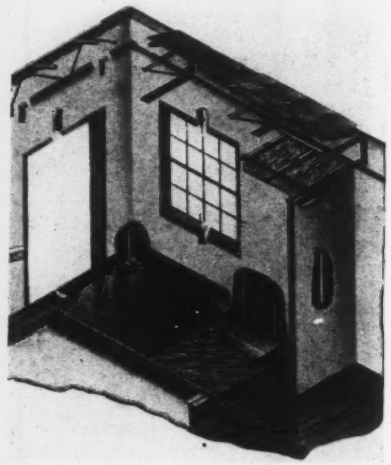
Hearings on Senator Lonergan's revised stream pollution bill, to begin March 23, are expected to develop decided opposition. It is believed that unless material changes are made in the measure, nothing will be gained by getting it through the Senate, as the House committee will in all probability pigeonhole it unless changes are made in the provisions for the disposal of sewage and other wastes. The Lonergan bill would amend Section 13 of the Act of March 3, 1899, relating to the deposit of refuse in the navigable waters of the United States, and Section 3 of the Oil Pollution Act of 1924. It is designed to give the government greater control over the pollution of navigable streams.

Crane and Shovel Company Starts Prefabricated House Business

The Harnischfeger Corp., Milwaukee, Wis., well known manufacturer of cranes, shovels and other construction equipment has converted its old West Allis plant for prefrabricated house manufacture and is offering a home with six rooms and a bath for about $4,000, payable $35 per month including amortization and all charges. The new Houses Division of the company will be fully responsible to the purchaser but will sublet erection to local contractors.

The framework of the house is fabricated from steel sections bolted and welded together. The exterior wall assembly consists of fire-resistant building board with an exterior finish of special weather-resisting color-process coatings. The floors, walls and ceiling are completely insulated. The base of the house is made of welded structural framework, the underside of which is completely covered by galvanized metal sheets and one inch of insulation. This base is designed to be erected on fourteen concrete piers.

The hip roof is in twelve sections, each constructed of steel rafters to which tongued and grooved roof boards are



Construction details of new factory made house

securely fastened, as a support for fire-resisting composition asphalt shingles.

The home provides six rooms and bath. There are two large bedrooms, a living room, dining room and an equipped kitchen and heater room. The home may be had with or without basement, and with two different types of roof—hip or flat. Heating is by an up-to-date forced warm air system. The house is completely wired and equipped with modern electric lighting fixtures.

The Housing Division will be in charge of Richard Binkowski, business manager. Production at the start will be at the rate of ten houses per week. For the present the houses will be marketed only in southern Wisconsin.

Sierra Madre Water Tunnel Holed Through in Record Time

All former tunneling speed records have been shattered in the driving of the Colorado River Aqueduct tunnels, and a new mark has been established in driving the Sierra Madre section of the distribution system tunnels at the west end of the project, which was holed through on March 9. The tunnel, 13 ft. in excavated diameter and 6,450 ft. long, was driven at the rate of 25 ft. per shift, two shifts per day working from one portal. In February 50 shifts advanced 1,500 ft., an average of 30 ft. per shift. Three consecutive shifts drove the tunnel 108 ft. for the highest rate of continuous performance. Driving was through partly-cemented, well-compacted alluvium, usually without shooting, but requiring steel rib timbering. The tunnel is being driven for the Metropolitan Water District of Southern California under the direction of F. E. Weymouth, general manager, and R. B. Diemer. The J. F. Shea Co. is contractor.

New Jersey Highway Funds Diverted for Relief

Diversion of $3,000,000 from state highway department funds for use in meeting a crisis which would have left the state without money for relief purposes, was finally voted by the New Jersey Assembly, March 15, after an unsuccessful, all-night battle to pass what was known as the luxury tax bill. It is estimated that the $3,000,000 voted for relief will last no longer than April 15.

The voting of this measure which had been previously passed by the state senate brings the total of funds diverted for relief to $23,000,000. It also creates a deficit of $234,466 in the highway department's accounts and will reduce the state's share of federal funds by $1,766,413, according to E. Donald Sterner, highway commissioner.

Detroit Building Code Receives Approval

A new building code for Detroit, Mich., covering every phase of building and construction work, was approved and adopted by the Common Council on March 10 and referred to the mayor for his signature. The building code has been in preparation for nearly twenty years. It consists of about 200,000 words.

SOCIETY CALENDAR

AMERICAN CERAMIC SOCIETY, annual meeting, Columbus, Ohio, March 29-April 4.

MIDWEST POWER ENINGEERING CONFERENCE, Chicago, Ill., April 20-24.

AMERICAN SOCIETY OF CIVIL ENGINEERS, spring meeting, Hot Springs, Ark., April 22-24.

AMERICAN WATER WORKS ASSOCIATION, annual meeting, Los Angeles, Calif., June 8-12.

SOCIETY FOR PROMOTION OF ENGINEERING EDUCATION, annual meeting, Madison, Wis., June 23-26.

AMERICAN SOCIETY FOR TESTING MATERIALS, annual meeting, Atlantic City, N. J., June 29 to July 3.

PUBLIC WORKS CONGRESS, joint meeting, AMERICAN SOCIETY OF MUNICIPAL ENGINEERS AND INTERNATIONAL ASSOCIATION OF PUBLIC WORKS OFFICIALS, Toronto, Ont., September 28-30.

INTERNATIONAL ASSOCIATION FOR BRIDGE AND STRUCTURAL ENGINEERING, second annual congress, Berlin, Germany, October 1-8.

KENTUCKY-TENNESSEE SECTION, AMERICAN WATER WORKS ASSOCIATION, Lexington, Ky., March 23-25.

NEW YORK SECTION AMERICAN WATER WORKS ASSOCIATION, Oswego, N. Y., March 26-27.

FLORIDA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual meeting, Tampa, March 31-April 1.

CANADIAN SECTION, AMERICAN WATER WORKS ASSOCIATION, Hamilton, Lafayette, Ind., April 7-9.

INDIANA SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Ont., April 1-3.

ILLINOIS SECTION, AMERICAN WATER WORKS ASSOCIATION, annual convention, Evanston, Ill., April 10-11.

AMERICAN WELDING SOCIETY, New York Section, at its monthly meeting on March 10 listened to a program on the subject of low-alloy high tensile steels arranged by Milton Male, chairman of the program committee. Speakers were A. B. Kinzel, chief metallurgist, Union Carbide & Carbon Research Laboratories and H. M. Priest, engineer, railroad research bureau, U. S. Steel Corp., Edwin F. Cone, editor, *Metals and Alloys*, presided.

Hurricanes Influence Design of New Neches River Bridge

Work has begun on a remarkable highway bridge over the Neches River in Texas six miles northeast of Port Arthur. Low marshy land either side of the 1,000-ft. wide stream, the necessity for passing ocean ships and the possibility of hurricanes were the chief factors influencing the design. Thus the channel span, a 680-ft. cantilever, provides for a vertical clearance of 177 ft. over a 600-ft. shipway, requiring a length of the bridge between grades at either end of 7,752 ft. Hurricane possibilities resulted in the adoption of a 75 lb. per sq.ft. wind load. High loads particularly as considered in their quartering and longitudinal effects gave rise to an unusual design in which the superstructure spans are supported on towers forming integral parts of the trusses, so that the wind shears may be carried down to the tops of the piers. These wind shears on the piers and the problems of designing the piers for adequate lateral stability made low piers desirable.

Lateral spread of the towers under the main span is 110 ft. The seven central spans are supported on caisson piers, each consisting of two separate cylinders sunk to hard foundations at 90 to 100-ft. depths. The pile foundations under the other spans are provided with inclined piles with carefully determined batters to provide for the transverse loads.

The project is being directed by G. G. Wickline who has been given a leave of absence from his position as bridge engineer of the Texas state highway commission. The plans and specifications were prepared by Ash-Howard-Needles & Tammen, consulting engineers, Kansas City and New York. Substructure contract of $840,000 was let Dec. 11 to the Union Bridge & Construction Co. of Kansas City. Bids for the superstructure were invited early in February. The bridge is a joint project of the Texas state highway commission and Jefferson County, Texas. The total cost will be about $2,500,000 in part met by a PWA grant.

Land Condemnation for Housing Held Legal in New York

In a decision on March 17, New York's highest state court, the Court of Appeals, upheld the right of the New York City Housing Authority to condemn land for slum clearance. The decision stated that "whenever there arises in the state a condition of affairs holding a substantial menace to the public health, safety or general welfare, it becomes the duty of the government to apply to it whatever power is necessary and appropriate to check the menace. The menace of the slums in New York City has long been recognized as serious enough to warrant public action."

Early Work Predicted on Great Lakes-St. Lawrence Seaway

Early undertaking of the Great Lakes-St. Lawrence Seaway project was predicted by President Roosevelt in a message read at the Great Lakes-St. Lawrence waterway conference at Detroit, March 11. The President also mentioned that something more than resubmission of the treaty was called for and therefore a new approach to the problems involved must be sought. The delay in ratification of the 1932 treaty was attributed, by the President, to groups which feared competition of public agencies in electric power distribution which would be carried out upon completion of the project. The improvement of the available resources for navigation and power was held to be an important part of the program in the present administration, enabling it to extend to the Northeast the benefits already assured to other sections by the TVA, Boulder Dam and Columbia River developments.

Major General E. M. Markham, Chief of Engineers, pointed out the value to the nation of opening lake ports to the ocean. He also pointed out that the project was economically sound.

Reports from Ottawa indicate that the present King government would be disposed to cooperate in reaching a somewhat different treaty from the one negotiated in 1932. Opposition of the province of Quebec is not expected to be as great as it was previously.

AWWA Awards Medals and Elects Honorary Members

The John M. Diven Memorial Medal was awarded to Harry E. Jordan, chemical engineer, Indianapolis Water Co., an immediate past president of the American Water Works Association, by the Board of Directors of that association. The Diven memorial medal is annually awarded to the member who has performed an outstanding service. Mr. Jordan was selected for his efficient enterprise in directing the work of the Joint Editorial Committee of the American Water Works Association and the American Public Health Association on the Standard Methods of Water Analysis. Mathew M. Braidech, senior chemist, Baldwin Filtration Plant, Cleveland, Ohio, was awarded the John M. Goodell prize for a paper entitled "The Spectrographic Determination of Minor Chemical Constituents in Various Water Supplies in the United States," which he wrote in collaboration with F. H. Emery, who, not being a member of the American Water Works Association, is not eligible to share the prize.

The board also announced the election of five honorary members. M. N. Baker, who retired, after many years of association, from the staff of the *Engineering News-Record*, was among those elected to honorary membership. Mr. Baker joined the American Water Works Association in 1903. Dr. Edward Bartow, professor of chemistry and chemical engineering, State University of Iowa, who has been active in the association's work since joining in 1906, was also made an honorary member. Charles R. Henderson, manager of the Davenport Water Co., Davenport, Iowa, and Nicholas S. Hill, Jr., consulting engineer of New York City and president of the Hackensack, N. J., Water Co., both of whom joined the American Water Works Association in 1901, were also elected to honorary membership as was Edward E. Wall, consulting engineer, St. Louis, Mo., who joined the association in 1904.

Obituary

E. G. BRADBURY, for 22 years sanitary engineer for Franklin County, Ohio, died March 11 at his home in Columbus.

THOMAS BEAL WARREN, for many years engaged in railroad construction engineering in the Dominican Republic following a connection with the Burlington system in this country, died in Boston on March 11. He was 77 years of age.

JAMES L. MEDLER, for 35 years associated with the Universal Atlas Cement Co. and recently assistant treasurer and secretary in the New York office, died recently at his home in Brooklyn. He was widely known in the cement industry and prior to his service in that field had served eleven years with the Central Railroad of New Jersey.

ALBERT HUNTINGTON HOOKER, 71 years of age, technical director of the Hooker Electro-Chemical Co., Niagara Falls, N. Y., and author of the book "Chloride of Lime in Sanitation," died March 10 at his home in Lewiston, N. Y. He was a well-known writer on technical chemical and engineering subjects and was an original member and chairman of the state board for licensing professional engineers and land surveyors.

ERNEST W. BRANCH, formerly city engineer of Quincy, Mass., died in Daytona, Fla., on March 8, following an illness of

many months. He was well known in the South Shore area of Massachusetts, and for some time had maintained offices in Quincy as a consultant. He was born in Smithfield, Me., 73 years ago, and during the World War was project engineer for the United States Housing Corp.

WILLIAM J. TWOMEY, chief engineer of the Yonkers, N. Y., pumping station, died on March 10 of pneumonia. He had been connected with the Water Bureau of that city for 35 years.

J. S. HALDANE, authority on mining engineering, died March 15 at his home in Oxford, England, after a month's illness. Professor Haldane was well known for his research work in connection with noxious gases in mines and public health questions. He was at various times attached to the faculties of the University of Glasgow, Oxford, Cambridge and Edinburgh.

DR. ALFRED E. MACINTYRE, 73, former chief chemist of the explosives division of the Canadian Department of Mines, died at his home in Ottawa on March 13, following a brief illness. Following sewer explosions that rocked Ottawa in 1929 and again in 1931, Dr. Macintyre was appointed chief consultant for Ottawa, and it was through his expert knowledge and advice that the cause of the blasts were finally determined.

JOHN P. CORLEY, district manager of the Wailes Dove-Hermiston Corp., at Cleveland, Ohio, died at Erie, Pa., on March 14 as the result of an automobile accident a few hours previous near that city. Mr. Corley was born in England in 1891, came to this country as a youth and studied at Fordham University. At the outbreak of the World War he enlisted in the Eleventh Engineers, rising to the rank of captain. Following the war Mr. Corley served first with the Ingersoll-Rand Co. pump division in San Francisco, later going to the Wailes Dove-Hermiston corp., first at Chicago and then at Cleveland.

FRANK OLTDORF, 51, a director of the Brazos River Conservation and Reclamation District in Texas, died recently of pneumonia. His death followed closely that of P. L. Downs, another director of the district.

CONSTRUCTION STATISTICS FOR THE WEEK

ENGINEERING awards for the week total $33,606,000, a lower volume than last week but ahead of last year. The loss from last week is in both private and public. The private volume for this week is $11,748,000 and public is $21,858,000 of which federal is $2,308,000 and state and municipal is $19,550,000. Corresponding values last year are: total, $21,854,000; private, $4,858,000; public, $16,996,000; federal, $1,882,000; state and municipal, $15,114,000. Private awards have made consistant gains over last year. On the cumulative total since the first of January private volume shows a gain of 115 per cent.

Highway awards continue to gain and record for the week a total of $8,274,000; sewerage is also higher at $3,345,000. Other classes of work are lower than last week. They total: public buildings, $3,685,000; commercial buildings, $3,608,000; industrial buildings, $4,690,000; bridges, $2,166,000; waterworks, $1,210,000; earthwork, drainage, $1,626,000; unclassified amounted to $5,002,000.

The week's larger awards include: blast furnace for Republic Steel Corp., Cleveland, Ohio, $1,300,000; grain elevator for Cerro, Inc., Minneapolis, at Shakopee, Minn., $700,000; two buildings at Veterans Hospital, Coatesville, Pa., $535,000; highways by West Virginia, $1,124,000; by Wisconsin, $448,000; scenic highway along Mississippi River between Alton and Grafton, relief labor by State Highway Department, Illinois, $2,500,000; overhead water storage tanks, Sacramento, Calif., $315,000; equipment for Southwest Sewage Treatment Plant, Chicago, Ill., $1,104,000; Upper Des Plaines intercepting sewer contract 1, Chicago, Ill., $643,000; Central Nebraska Public Power and Irrigation District, 96.6 mi. irrigation canals and 86 timber bridges, Nebraska, $623,000; Niagara-Hudson Power Corp., Buffalo, N. Y., 2,000 mi. distribution lines, contract and day labor, $2,500,000.

CONTRACTS
(Thousands of Dollars)

	Weekly Average Mar. 1935	Prev. 4 Weeks	Week Mar.19 1936
Federal Government	$3,373	$2,102	$2,308
State and Municipal	13,845	25,084	19,550
Total public	$17,218	$27,186	$21,858
Total private	5,521	14,189	11,748
Week's total	$22,739	$41,375	$33,606
Cumulative to date:			
1935...$288,727,000	1936...$569,132,000		

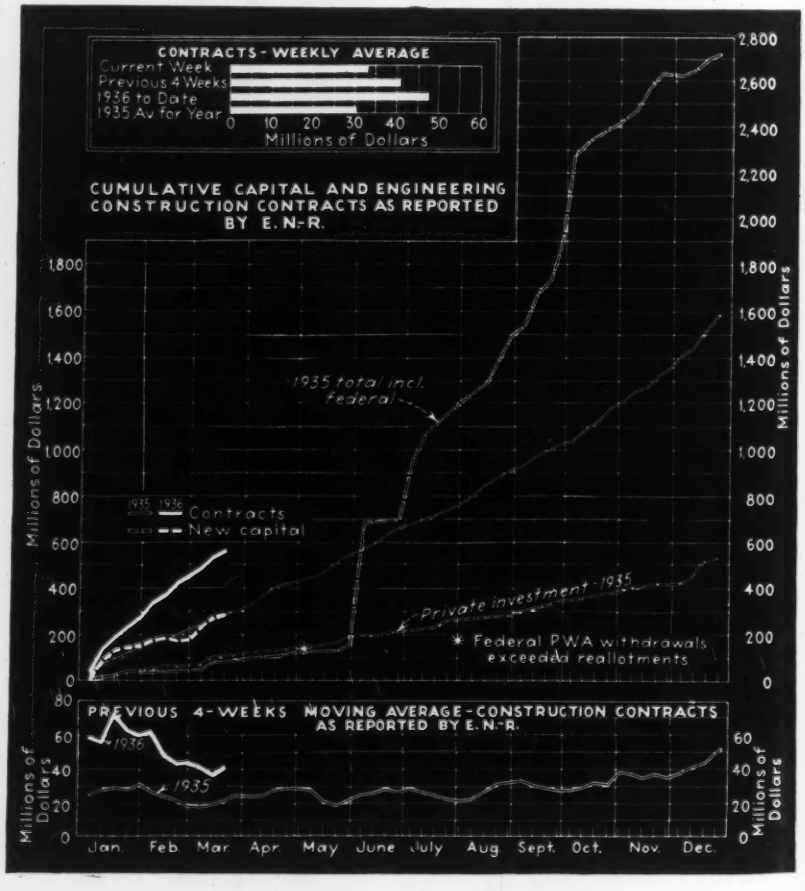
NEW PRODUCTIVE CAPITAL
(Thousands of Dollars)

1936	Week Mar.19	Cumulative
State and municipal	$7,755	$128,230
PWA non-federal	—6,102	55,757
RFC loans	....	25,000
Corporate issues	6,205	67,546
PWA loans	....	1,270
Total Non-Federal	$7,858	$277,803
Federal	....	4,771
Total new capital	$7,858	$282,574
Cumulative to date:		
1935...$86,629,000	1936...$282,574,000	

Note: These figures include private bonds, and stocks sold for productive purposes; state and municipal bonds for construction; PWA loans and grants to states and municipalities, including the special highway funds; PWA private loans, and allotments for federal construction, deficiency act funds. An arbitrary percentage (25%) of the WPA allotments and local contributions to WPA work is included to allow for the capital additions through the Works Progress Administration division of the new program.

INDEX NUMBER

ENR Cost	1913 = 100	1926 = 100	ENR Volume	1913 = 100	1926 = 100
Mar., 1936	**201.20**	**96.71**	**Feb., 1936**	**176**	**77**
Feb., 1936	201.20	96.71	Jan., 1936	248	109
Mar., 1935	194.26	93.38	Feb. 1935	76	33
1935 (Av.)	195.22	93.84	1935 (Av.)	135	58
1934 (Av.)	198.10	95.23	1934 (Av.)	114	50
1933 (Av.)	170.18	81.80	1933 (Av.)	102	47



CONSTRUCTION REPORTS

WATERWORKS

PROPOSED WORK

Calif., Maxwell—See "Sewerage and Waste Disposal."

Calif., Placentia—City, election Apr. 14, $75,000 bonds to provide establishment of municipal water plant, proceeds of bonds to be used either to acquire existing system of American States Water Service Co. or to construct an entirely new system. G. Bates, City Hall, engr.

Idaho, Preston—City, rebuilding and enlarging present distribution system and increasing reservoir capacity from 250,000 gal. to 750,000 gal. by adding two reservoirs. $30,000. Will hold election soon to approve P.W.A. loan. R. G. Harding, Bountiful, engr.

Ill., Lombard—Village soon takes bids constructing 600,000 gal. ground reservoir; 250,000 gal. elevated steel tank. J. E. McCoy, village attorney.

N. Y., Ballston Spa.—Village will not construct waterworks. $34,365. P.W.A. funds not granted and project abandoned. Noted Aug. 7, C.D.—Aug. 15, E.N.-R.

N. Y., Brooklyn—New York Water Service Co., 90 Broad St., New York, plans 132 ft. diam. water storage tanks, 3402 Foster Ave. $65,000. T. H. Wiggins, c/o owner, engr.

N. Y., Esopus—Village will not construct waterworks. $56,250. P.W.A. funds not granted and project abandoned. Noted Dec. 6, C. D.—Dec. 12, E. N.-R.

N. Y., Indian Lake—Village will not construct waterworks. $49,909. P.W.A. funds will not be granted and project abandoned.

Tex., Orange Grove — City, c/o A. Wendt, mayor, voted bonds for waterworks system, incl. elevated steel tank and tower, watermains, pumps, deep well completed. $46,000. P.W.A. project. H. R. F. Helland, Frost Bldg., San Antonio, engr.

Pa., Sugar Grove—Village abandoned for time being plans for municipal waterworks and distributing system. $45,500. Application for Federal loan and grant delayed beyond date set. Project may be revived soon. Noted June 7, C. D.—June 13, E. N.-R.

Utah, Goshen — Town plans distribution system and supply line to replace present system. $36,264. P.W.A. loan approved. H. Price, Provo, engr.

Utah, Hurricane—Town plans replacing present wood pipe distribution system and supply line with c.i. pipe. $33,546. P.W.A. loan granted. W. Cannon, St. George, engr.

Ont., London—W. M. Veitch, city engr., soon takes bids constructing 10 in. main in Oxford St. $30,000 hydrants $1,000, meters $3,000.

Que., Caughnawaga — Secretary Dpt. Indian Affairs, Ottawa, Ont., soon takes bids constructing new filtration plant. Est. about $50,000. D. J. Jacobs, Caughnawaga, engr.

BIDS ASKED

Ill., Troy—Mar. 27, by City, City Hall, constructing water supply system, incl. supply main, booster pumping station, distribution system, elevated storage tank, service meters, hydrants and valves. Kinsey & Fulton, 20 South Central St., St. Louis, Mo., engrs.

Ia., Glidden—Mar. 24, by City, extending and improving waterworks system, by adding water softening equipment, zeolite type on foundations provided by town. Young & Stanley, Muscatine, engrs.

Mass., Needham—See "Contracts Awarded."

Mich., Detroit—Mar. 24, by Bd. Water Comrs., Water Bd. Bldg., 735 Randolph St., furnishing, delivering and erecting addition to incinerator stack at Springwells Station, Spec. PS 204.

Mich., Mt. Clemens—See "Contracts Awarded."

Minn., Henning—Mar. 26, by Village, S. A. Aune, clk., furnishing, installing 50,000 gal. wooden tank on 100 ft. steel tower, and pumping equipment also 11x14 pump house. Druar & Milinowski, 830 Globe Bldg., St. Paul, engrs.

N. Y., Newfane — Mar. 27, by Town Bd., Town Hall, furnishing, installing suction well and low lift station located on shore of Lake Ontario, and filter plant, about 500 ft. east of low lift station, $39,425; intake well and intake pipe line to be placed on Lake Ontario, and extending to suction well, a water line extending from suction well to filter plant and water line from filter plant to present distribution system, $58,037. P.W.A. and W.P.A. project. Industrial Planning Corp., 271 Delaware Ave., Buffalo, engrs.

N. Y., Niagara Falls—Mar. 27, by City Manager, City Hall, installing concrete lined tunnel, concrete intake structures and appurtenances, alternate proposal furnishing, installing 2,210 lin.ft. 54 in. intake pipe from pumping station to intake crib. $145,000. W. D. Robbins, city mgr. P.W.A. project; adv. E. N.-R., Mar. 19. Noted Jan. 28, C. D.—Jan. 30, E. N.-R.

N. Y., St. Regis Falls—Apr. 1, by Town Bd. of Waverly, at office Supervisor, St. Regis Falls, constructing water supply system. $80,431. P.W.A. project; adv. E. N.-R. Mar. 19.

Tenn., Jackson—See "Sewerage and Waste Disposal."

Tex., Orange Grove—Mar. 26, by City, c/o A. Wendt, mayor, gravel water well, c.i. distribution system with fire hydrants, surface reservoir, pump station, pumping equipment, tapping machine and elevated tank, 2,425 ft. 8 in., 9,220 ft. 6 in. c.i. pipe and 5,400 ft. 2 in. c.i. or G.S. pipe. $41,000. P.W.A. project. H. R. F. Helland, 1020 Frost Bldg., San Antonio, engr. Noted Jan. 14, C. D.—Jan. 16, E. N.-R.

Va., Pound — Mar. 24 (extended date), by Supervs. Wise Co., waterworks system. P.W.A. project. Wiley & Wilson, Lynchburg, consult. engrs. Noted Mar. 5, C. D.

Ont., London — P. Utilities Comn., E. V. Buchanan, genl. mgr., Dundas St., taking bids drilling 3 wells for increased water supply. Owners Staff, engrs.

CONTRACTS AWARDED

Calif., Sacramento—H. G. Denton, city clk., two 3 m.g.c. concrete overhead water storage tanks, to Campbell Constr. Co., 800 R St., $315,347. Est. $350,000. Bids Feb. 20, awarded Mar. 3. **P.W.A.** Noted Feb. 26, C.D.—Feb. 6, E.N.-R.

Ga., Ft. Valley—City, constructing part waterworks well, deep well, to Layne Atlantic Co., New Monroe Bldg., Norfolk, Va., $13,100; pumps and other parts waterworks, to E. F. Scott & Co. Inc., 140 Westminster Dr., Atlanta, $38,690. Est. $55,000. **P.W.A.** Noted Nov. 19, C. D.—Nov. 21, E. N.-R.

Ga., Ringgold—Robert Co., engrs., Bona Allen Bldg., Atlanta, constructing filter plant improvements, incl. 2 story, 200,000 g.p.d. filtration plant, for City, to V. B. Higgins & Co., Kinney Bldg., Charlotte, N. C., about $20,000. Noted Feb. 21, C. D.—Aug. 29, E. N.-R.

Ill., Joliet — Dpt. P. Wks. & Bldgs., Div. Architecture & Eng., Springfield, drilling and casing well at Illinois State Penitentiary, Statesville Branch, to W. S. Thorne Co., 1203 Thacker St., Des Plaines, $12,750. Bids Feb. 11, awarded Feb. 25.

Ill., Sparland—City, waterworks and distribution system, to Ostrom Realty & Constr. Co., Peoples Bank Bldg., Indianapolis, Ind., $26,143. **P.W.A.** Bids Nov. 7. Noted Nov. 1, C. D.—Oct. 10, E. N.-R.

Ill., Shawneetown—City, 2 wells, one 80,000 gal. tank on 100 ft. tower, 23 fire hydrants, 200 service meters, gate valves and boxes; distribution mains and single services, pump house, turbine pump and motor, to Dobson & Humphreys, Omaha, $47,176. Est. $50,909. **P.W.A.** Bids Dec. 20. Noted Dec. 12, C. D.

Ind., Evansville—Water Dpt., J. W. Heyns, secy., City Hall, to J. B. Clow Co., 201 North Talman Ave., Chicago, Ill., 16,000 ft. 12 in. c.i. pipe at $1.70 per ft.; 6,000 ft. 8 in. at 98.92c. per ft.; and 2,000 ft. 6 in. at 69.2c. per ft. Bids Mar. 5, awarded Mar. 5. Noted Dec. 4, C. D.

Mass., Needham—Town, L. C. Hollis, supt. P. Wks., Town Hall, constructing waterworks system, incl. driving wells, laying c.i. mains and connections to present system, constructing and equipping pumping station, day labor, under **W.P.A.** $87,000. Owner soon takes bids furnishing c.i. pipe. H. Goodenough, Inc., 14 Beacon St., Boston, engrs. Noted Sept. 26, C. D.—Oct. 3, E. N.-R.

Mich., Muskegon — City, superstructure 16 m.g.p.d.c. filtration plant, to Muskegon Constr. Co., Muskegon, $74,690***filtration plant and other equipment, to Bass Eng. Co., 209 Curtis Bldg., Detroit, $133,111***1 m.g. steel tank and tower, to Chicago Bridge & Iron Wks., 37 West Van Buren St., Chicago, Ill., $70,690. Grand total $278,491. **P.W.A.** Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Mich., Mt. Clemens—City, furnishing 4,000 ft. 12 in. c.i. water pipe, to B. Clow & Sons, 201 North Talm Ave., Chicago, Ill., at $1.84 per ft., total $7,360; fourteen 12 in. valves, to A. P. Smith Co., 545 North Arlington Ave., East Orange, N. J., at $20.90 each, total $393. Work by relief labor. **W.P.A.** E. L. Pettingill, city engr.

Mo., St. Louis—City, constructing rein.-con. brick chimney, 230 ft. high, for waterworks pumping station at City Sanatarium, Brannan Ave. and Arsenal St., to J. V. Boland Constr. Co., 2715 Dalton Ave., $18,158. Est. $14,500. **P.W.A.** Bids Feb. 18. Noted Feb. 24, C. D.—Feb. 6, E. N.-R.

Neb., Elba — City, brick pump house for waterworks, to J. Rott, St. Paul, $644; pipe and specials, to McWane Cast Iron Pipe Co., Dierks Bldg., Kansas City, Mo., $5,448. **P.W.A.** Bids Dec. 13. Noted Dec. 19, C. D.—Dec. 26, E. N.-R.

Neb., West Point—City, watermains and sewers and storm sewers, Sect. 2, and furnishing, installing lights, steel poles and underground cables, to C. Robeck & Co., Omaha, $32,911. Est. $33,541. **P.W.A.** Bids Feb. 14. Noted Feb. 10, C. D.

N. Y., Brooklyn—New York Water Service Corp., 90 Bway., New York, artesian well at 1015 Franklin St., to Sprague & Henwood, 11 West 42nd St., New York. Est. about $29,000. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., Oswego—City, meters for waterworks, to National Meter Co., 1st Ave. and 42nd St., Brooklyn***hydrants, to Rensselaer Valve Co., Ontario St., Troy***valves, to Kennedy Valve Mfg. Co., Elmira***transite pipe, to Johns Manville Co., 22 East 40th St., New York, through Edward Joy Co., Washington St., Syracuse. **P.W.A.** Noted Dec. 23, C. D.—Dec. 26, E. N.-R., under "Contracts Awarded."

N. Y., Westfield—Village, filtration plant, reservoir and auxiliary dam, filtration and pumping equipment, relief labor. $54,000. **W.P.A.** project. E. Noonan, Bailey Bldg., Lockport, procurement officer, W.P.A., will purchase materials, incl. filtration and pump equipment. Noted Jan. 20, E. N.-R., under "Contracts Awarded."

O., Baltimore—City, constructing waterworks system, Contr. 2, distribution system, to C. J. Wetzel, 126 Otterbein Ave., Dayton, $33,738; Contr. 4, water treatment plant, to J. W. Goetz, 126 Otterbein Ave., Columbus, $12,580. **P.W.A.**

O., Bellevue—City, constructing waterworks improvement, Contr. E, filtration plant, to Lowensohn Constr. Co., 1740 East 12th St., Cleveland, $148,263. **P.W.A.** Noted Jan. 31, C. D.—Feb. 6, E. N.-R.

O., Cincinnati—City, four sludge pumps, adjustable capacity 15 g.p.m. to 75 g.p.m. each and conditioning flocculating appurtenances to condition water in two basins, each 175x120x 20 ft., to Dorr Co. 247 Park Ave., New York, $2,985 and $100,160 respectively. **P.W.A.** Noted Nov. 21, C. D.

O., Groveport—City, constructing waterworks system, Contr. 3, elevated tank, to Pittsburgh-Des Moines Steel Co., 1 Neville Island, Pittsburgh, Pa., $9,985; Contr. 4, iron removal plant, to W. F. Schmidt, 1413 Philadelphia Ave., Dayton, $7,356. **P.W.A.** Noted Jan. 17, C. D.

Ont., Welland—City, furnishing turbine for filtration plant, to Turbine Equipment Ltd., 21 King St. E., Toronto, $2,537.

SEWERAGE AND WASTE DISPOSAL

PROPOSED WORK

Calif., Maxwell—Maxwell Public Utility Dist., C. N. Lausten, secy., voted bonds for sewerage and waterworks improvements. $45,000. Noted Jan. 17, C.D.—Jan. 23, E.N.-R.

★ **Conn., New Haven**—City made plans sewage disposal plant, Christian Lane. $424,875. Fuller & McClintock, 11 Park Pl., New York, engrs. P.W.A. project. Noted May 23, C. D.—May 30, E. N.-R.

★ **Ill., Belleville**—City, activated sludge type sewage disposal plant complete with auxiliary piping, appurtenances, etc. $434,545. $195,-

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C. D. Construction Daily
E. N.-R. Engineering News-Record
Federal Government projects symbol †

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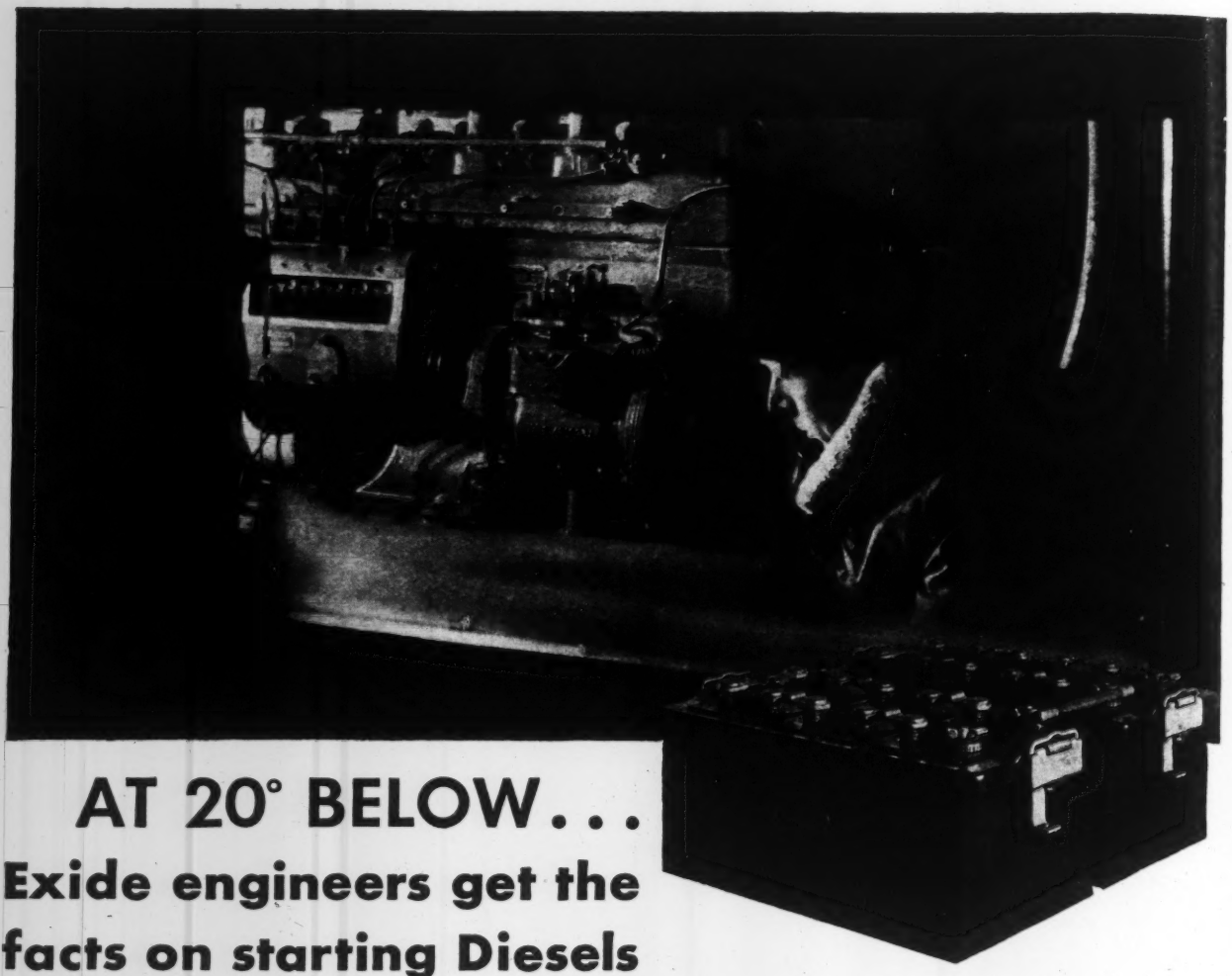
†*Federal Government.*



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BATTERIES FOR STARTING DIESEL ENGINES

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Sewerage, etc. (Continued)

545 P.W.A. grant approved contingent on city voting $239,000 in bonds. J. G. Cooney, 3303 Rowland St., engr. Noted Sept. 9, C.D.—Sept. 12, E.N.-R.

Mo., Seneca — Municipality plans sewerage system. $50,000. A. C. Moore, Joplin, engr.

Mo., Webster Groves (St. Louis P. O.)—City soon takes bids constructing sanitary sewers in various streets. $18,360. P.W.A. grant approved. J. B. Clayton, city engr.

N. Y., Binghamton—City, will not construct Brandywine Sewer. P.W.A. grant rejected and project abandoned. $362,000. Noted Sept. 11, C.D.—Sept. 19, E.N.-R.

N. Y., Lake George—Village will not construct sewers in various streets. $88,000. P.W.A. funds will not be granted and project abandoned. Noted Oct. 24, C.D.—Oct. 31, E.N.-R.

N. Y., Plattsburg—City will not construct sewage disposal plant. $153,000. P.W.A. funds will not be granted and project abandoned. Noted Oct. 25, C.D.—Oct. 31, E.N.-R.

N. Y., Schenectady—City will not construct sewage disposal plant. P.W.A. funds will not be granted and project abandoned. $102,645. Noted Oct. 8, C.D.

N. Y., Schenectady—City will not construct garbage incinerator. $60,277. P.W.A. funds will not be granted and project abandoned. Noted Oct. 18, C.D.—Oct. 24, E.N.-R.

★ **Pa., Erie**—City, Engineering Dpt., preparing final plans and specifications for storm and sanitary sewer improvement and extension program throughout the city. Est. $1,000,000. **Maturity early in summer.** May apply for Federal funds to finance. A. N. Aitkin, city engr.

Tex., Laredo—City, A. Martin, mayor, voted bonds and soon takes bids for extending 12- to 18-in. vitr. clay or rein.-con. sanitary sewer lines in outlying districts. $55,000. J. W. Beretta Engineers, Inc., National Bank of Commerce Bldg., San Antonio, engrs. P.W.A. project. Noted Sept. 27, C. D.—Oct. 3, E. N.-R.

Que., Stanstead—Municipality, R. J. Meekeon, mayor, soon takes bids complete sewerage system. Provincial Dpt. P. Wks., Quebec City, engrs. Noted Oct. 11, C. D.—Oct. 17, E. N.-R.

BIDS ASKED

★ **Ark., Little Rock**—Mar. 30, by R. E. Overman, mayor, improvements to sewers, incl. construction of septic tank, extending present system, Dist. H 103, southwestern part of town, traversing the southern part to Fouche Creek. Second section of $1,654,000 project. H. E. Carter, National Stand. Bldg., engr.

Conn., Bloomfield—Apr. 7, by Bd. Contr. & Supply, Metropolitan District, Bureau P. Wks., 550 Main St., Contr. 1, constructing 8,000 ft. 8, 24 and 39 in. sanitary sewers and appurtenances, Blue Hills Sewer Project. $235,327. R. N. Clark, Bureau P. Wks., engr. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

Conn., New Britain—Apr. 6, by City, sewage disposal plant, Christian Lane, incl. dosing, mixing and settling tanks and service building, equipment includes screening, chemical feeding, vacuum filtering, incinerating accessories for 9 m.g.d. sewage treatment plant. $424,875. P.W.A. project. Fuller & McClintock, 11 Park Pl., New York, engrs. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

Ill., Chicago—Mar. 26, by Sanitary Dist. of Chicago, 910 South Michigan Ave., repairing brickwork and lightning protection system at 39th Street Pumping Station.

Ill., Peoria—Mar. 26, by Greater Peoria Sanitary & Sewerage Disposal Dist., W. C. Leitner, vice pres., constructing sewers. P.W.A. project, Greeley & Hansen, 6 North Michigan Ave., Chicago, engrs. Noted Feb. 21, C. D.—Feb. 27, E. N.-R.

Mass., Beverly—See "Contracts Awarded."

Minn., Fergus Falls—Mar. 24, by City, constructing sewage disposal plant, interceptor sewers and 2,000 lin.ft. tunnel work. $161,000. P.W.A. project. Pillsbury Eng. Co., 1200 2nd Ave. S., engrs. Bids Jan. 14 rejected. Noted Jan. 10, C. D.—Jan. 16, E. N.-R.

Minn., Gibbon—Mar. 30, by Village, R. Bullemer, clk., plans constructing sanitary sewerage system. $25,000. P.W.A. project. Druar & Millinowski, 830 Globe Bldg., St. Paul, engrs.

Neb., Ingleside—Mar. 30, by State Bd. Control, Capitol Bldg., Lincoln, constructing sewage disposal plant. Part of $500,000 project. P.W.A. project.

N. J., New Providence—Mar. 31, by City, Contrs. A, C, D, E, F for sewerage system. Noted Mar. 3, C. D.—Jan. 30, E. N.-R.

N. Y., Herkimer—Apr. 6, by Village, Municipal Bldg., constructing sewage disposal plant. P.W.A. project. Bids Dec. 10 rejected. H. W. Taylor, 11 Park Pl., New York, consult. engr. (**Correction**—Date of bids.) Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

N. Y., Long Island City—Mar. 23, by J. J. Halleran, acting pres., sewers in Weeks Lane, Dry Harbor Rd., Horace Harding and Van Wycks Blvds., Turin Dr., Saultell, Colonial, Peck, 50th, 47th, 113th, 116th, 123rd and 115th Aves., 89th, Van Doren, Van Cleef, 202nd, Oceania, 170th, 96th, Daniels and Mexico Sts.

†*Federal Government.*

Pa., Radnor—Mar. 30, by Bd. Comrs. Randor Twp., 212 East Lancaster Ave., Wane, constructing sanitary sewer and measuring device (Ithan Creek Intefcepting Sewer Measuring Chamber). P.W.A. project. C. F. Mebus, 112 South Easton Rd., Glenside, consult. engr.

Pa., Scranton—See "Contracts Awarded."

Tenn., Jackson—Apr. 2, by City Comr., at office A. B. Foust, mayor, constructing sanitary sewer extensions in East and West Jackson, Sub-project A; aerator and 3 m.g. reservoir and making necessary changes in piping, installation of high head pump, Sub-project B; furnishing 1 low head pump, Sub-project C1; 1 high head pump, Sub-project C2; 4,100 water meters, Sub-project D1; 4,100 meter boxes, Sub-project D2; 4,000 meter holding devices, Sub-project D3; installation above meters, meter boxes and holding devices, Sub-project E. P.W.A. project. Noted July 20, C. D.—Aug. 1, E. N.-R., under "Waterworks."

Wis., Appleton—Mar. 27, by City, sanitary sewers. P.W.A. project. Greeley & Hansen, 6 North Michigan Ave., Chicago, Ill., engrs.

Que., Montreal—See "Contracts Awarded."

CONTRACTS AWARDED

Colo., Colorado Springs — City, constructing 10 m.g.p.d.c. sewage treatment plant, to Chambers Co., Lincoln, Neb., with a Nichols-Herreshoff sludge and garbage incinerator at combined price $168,805. Bids Mar. 7. Noted Feb. 27, C. D.

Colo., Greeley—City, constructing sewage disposal plant, to Chambers Constr. Co., 506 1st Natl. Bank Bldg., Lincoln, Neb., $52,395. **P.W.A.** Noted Jan. 21, C. D.—Jan. 23, E. N.-R.

★ **Ill., Chicago** — Sanitary Dist. of Chicago, 619 South Michigan Ave., constructing Upper Des Plaines Intercepting Sewer, Contr. 1, to Michall Pontarelli, Inc., 4248 North Kilpatrick Ave., $643,600***pump, blower house, chlorination and screen house, service tunnel, gate house, master sewerage meter, etc., for Southwest Sewage Treatment Works, Div. GG, to Central States Electric Constr. Co., 844 Push St., Chicago, $48,640. Bids Mar. 5. Noted Mar. 11, C. D.—Feb. 27, E. N.-R.

★ **Ill., Chicago**—Sanitary District of Chicago, 910 South Michigan Ave., furnishing, delivering 2 steam turbine driven generator units, each with rated capacity 5,000 kva. at 80% power factor complete with auxiliary equipment, appurtenances and accessories, Div. I, and furnishing, delivering six 1,667 kva., 60 cycle single phase, oil insulated self-cooled outdoor power transformers complete with appurtenances, Div. L, for Southwest Sewage Treatment Plant, to Allis Chalmers Mfg. Co., 135 South LaSalle St., Chicago $200,000 and $27,000 respectively***furnishing, delivering 2 units of steam condensing equipment, each unit including condenser having not less than 5,500 sq.ft. effective surface, complete with auxiliary equipment, Div. J., to Foster-Wheeler, 105 West Adams St., $54,500***furnishing, delivering 10 venturi meters, from 12- to 114-in. with registers and appurtenances, Div. T, to Builders Iron Fdry., Providence, R. I., $44,638***constructing, furnishing, delivering twenty-four 12- to 24-in. valves, 33 sluice gates, operating mechanism and appurtenance, Div. U, to Koppers Constr. Co., Fort Wayne, Ind., $40,148*** furnishing, constructing influent effluent, sludge return and miscellaneous conduits, service tunnel, chlorinator and condenser water screen house and control structures, Div. P, to E. J. Albrecht Co., 2632 West 26th St., $737,799. Grand total $1,104,085. **P.W.A.** Noted Mar. 5, C.D.—Feb. 20, E.N.-R.

Mass., Barnstable—Town, C. A. Crocker, chn. Bd. Selectmen, Town Hall, Contr. 1, clay pipe and concrete sewers and force main, to I. Capaldi & Sons, Inc., 270 Mt. Pleasant Ave., Providence, R. I., $119,833; Contr. 2, sewage pumping station and sewage treatment plant, to Cenedella & Co., 166 Main St., Milford, $56,204. Noted Feb. 21, C. D.—Feb. 13, E. N.-R.

Mass., Beverly—City, J. Blackmer, P. Wks. Dpt., City Hall, vitr. clay sewer lines in various streets, day labor. $51,000.

Mo., Webster Groves—Webster Groves Sanitary Dist., W. H. Brown, secy., 122 West Lockwood Ave., constructing Sect. B, trunk line sewerage system, to Crean & Scott Corp., 1242 Sublette Ave., St. Louis, $90,180. Subject to final approval by P.W.A. **P.W.A.** Bids Mar. 6. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

Neb., West Point—See "Waterworks."

N. J., Elizabeth—Joint Meeting Cities of East Orange, Newark and Summit, Townships of Hillside, Maplewood, Millburn and Union, Town of Irvington and Village of South Orange and Roselle Park, constructing Contr. D, sewage disposal plant, electrical work, to Dilley Co., Inc., 34 William St., East Orange $13,458*** resurfacing driveways, bituminous stone paths, to Middlesex Concrete Products & Excavating Corp., St. George Ave., Woodbridge, $8,541 (tentatively awarded)***4 yr. contract for the barging of sludge to sea from sewage disposal plant, to Merritt Chapman & Scott Corp., 17 Battery Pl., New York, about $100,000. **P.W.A.** Bids Feb. 6. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

N. J., Essex Fells—Boro, constructing sewage disposal plant, to Scola Constr. Co., 415 Ridgewood Ave., Glen Ridge, $45,750***heating and

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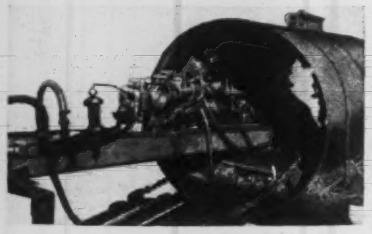

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Sewerage, etc. (Continued)

plumbing, to Heating & Plumbing Co., Essex Fells, $1,090 and $960***electrical work, to Beach Electric Co., 81 Wallace St., Newark, $1,012. Grand total $48,812. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

N. J., New Providence—City, Contr. B, for sewerage system, to Suburban Eng. Co., 15 West 38th St., New York, $87,244. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

O., Columbus—City, constructing relief sanitary and storm sewers, Contr. 54, Bliss Run Dist., Part 3, to N. Cenci, 1381 Essex Ave., $57,914. **P.W.A.**

O., Columbus—City, constructing relief sanitary and storm sewers, Contr. 56, Oakland Park Ave. District Storm Sewer, Part 1, to N. D. Mancini, 297 South High St., $63,305. **P.W.A.** Noted Feb. 5, C. D.—Feb. 13, E. N.-R.

O., Columbus—City, constructing sanitary sewer extending in Clermont Ave., Cooke Rd., Canyon, Lenappe, Yaronia, Overbrook Drives and Indianola Ave., Indiana Springs Dist., Contr. 59, Part 3, to N. D. Mancini, 297 South High St., $42,964. Est. $68,000. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

O., Greenville — City, constructing sewage treatment plant, main building, 1 and 2 story, 33x37 ft. settling tanks, digestion tanks, trickling filters, sludge beds and appurtenances, to H. and F. H. Hosea, 622 Broadway, Cincinnati, $125,000. Est. $153,242. **P.W.A.** Bids Feb. 14. Noted Jan. 31, C. D.—Feb. 6, E. N.-R.

Pa., North East—Borough, constructing sewage disposal plant, pump house, equipment, collection tanks, sprinkler system, filters, piping and new digestion tanks, relief labor. Work started. Cast iron pipe, to U. S. Cast Iron Pipe & Foundry Co., Webb-Crawford Bldg., Birmingham, Ala.***steel, to Erie Concrete & Steel Supply Co., 1301 Cranberry St., Erie*** cement, to M. H. Reid, North East. Hill & Hill, 503 Marine Bank Bldg., Erie, engrs.

Pa., Scranton—City, completion sanitary sewerage system in 22nd Ward, own forces under direction W. A. Schunk, dir. P. Wks. Est. $25,000. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

Tex., San Antonio—City, C. K. Quin, mayor, sewer plant improvements at disposal plant, digester tank, valve houses, etc., to L. L. Smith, c/o Builders Exchange, $32,500. Bids Feb. 13. Noted Mar. 4, C. D.

Tex., Tyler—City, c/o A. H. Balch, mgr., vitr. tile collecting mains, manholes, cleanouts, c.i. force mains and 2 lift stations, to Beaumont Constr. Co., Beaumont, $39,865. Est. $54,000. **P.W.A.** Bids Feb. 14. Noted Feb. 24, C. D.—Feb. 6, E. N.-R.

Tex., Wharton — City, A. H. Armstrong, mayor, storm sewers and sewerage system improvements, to Russ Mitchell, Inc., 2701 Texas Ave., Houston, about $42,280. **P.W.A.** Bids Dec. 10. Noted Jan. 2, C. D.—Sept. 26, E. N.-R.

Wis., Green Bay—Metropolitan Sewerage Comm., constructing river crossing Contr. C, to Waterways Eng. Corp., Green Bay, $59,700. **P.W.A.** Bids Mar. 4. Noted Mar. 11, C.D.—Feb. 27, E.N.-R.

Wis., Milwaukee—Metropolitan Sewerage Comm. of Milwaukee Co., constructing special section concrete main sanitary sewer in West Villard Ave., North 60th St. and Silver Spring Dr., and soot, ash, fly ash and conveyor systems, to Wenzel & Henoch Constr. Co., 1524 North 27th St., $110,659 and $29,747 respectively***turbo-generators, to Industrial Heating & Eng. Co., 828 North Bway., $22,650*** sprinkler system, to O. A. Waskow, 2222 West State St., $2,987***36 in. diam. cast iron, siphon across Milwaukee River at Auer Ave., to G. R. Febr, Inc., 2755 South 34th St., $41,272. Grand total $207,315. **P.W.A.** Bids Nov. 14. Noted Nov. 24, C.D.

Que., Montreal — Municipality, constructing sewers in St. James and Craig Sts., day labor, $50,000. Montreal Sewer Comm., City Hall, engrs.

BRIDGES AND GRADE CROSSINGS

PROPOSED WORK

Ind., Anderson—City, Madison Co. and State Hy. Dpt., Indianapolis, made plans constructing 600 ft. bridge across White River and Killbuck Creek, connecting Jackson St. in Anderson with Bway. in North Anderson, $300,000. State Hy. Bd., Indianapolis, engrs. (**Correction**—cost of project.) Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

Iowa—State Hy. Comn., Ames, soon takes bids constructing one multiple span I-beam bridge, incl. 97 cu.yd. Class 1 and 83 cu.yd. Class 2 excav., 13 corrugated, 10 rein.-con. pipe, 20 rein.-con. box and 1 corrugated metal pipe culverts to relay on secondary road from Imogene North to U. S. Rd. 34, Fremont and Mills Counties; one 150x20 ft. continuous I-beam bridge on secondary road south of Bloomfield, Davis Co., 240 cu.yd. Class 1 and 120 cu.yd. Class 2 excav.; four 130x20 ft. high truss spans with two 50x20 ft. I-beam approach spans, 250 cu.yd. Class 1 and 760 cu.yd. Class 2 excav. on secondary road in Sect. 36, [illegible] of Stratford, Hamilton and Webster Counties, F. R. White, ch. engr.

Iowa—State Hy. Comn., Ames, soon takes bids constructing 11 rein.-con. pipe and 17 rein.-con. box culverts and extensions on Primary Rd. 10 between Strawberry Point and Elkwood, incl. 253 cu.yd. Class 1 excav.; 1 corrugated metal pipe culvert extension, 12 rein.-con. pipe culverts, 22 rein.-con. box culverts and extensions on Primary Rd. 154, from Primary Rd. 11 through Arlington, Fayette Co.; also one I-beam bridge, on same road. F. R. White, ch. engr.

Ia., Elkader—Clayton Co., E. F. Seifert, and soon takes bids constructing bridges and culverts, $51,904; 46.5 mi. grading, $119,695; 50.64 mi. crushed stone surfacing, $63,080. D. E. Hoover, co. engr.

Missouri—State Hy. Dpt., Jefferson City, plans bridge over Yellow Creek, on road from Rothville South, Chariton Co.; one 80 ft. bridge over Fuch Banch from New Point to Route 275, Holt Co.; 30 ft. I-beam bridge over Pole Cat Creek, Route 13, Harrison Co.; 90 and 105 ft. steel through plate girder spans, over Weldon Fork from Brimson North, Grundy Co.; 110 ft. and 60 ft. steel truss span bridge over East Fork Grand River, on road from Stanberry to Gentry Co.; four 40 ft. and one 50 ft. bridge over Cypress Creek, on road from Bethany South, Harrison Co.; one 45 ft. I-beam bridge over West Tarkio Creek from Milton to Fairfax Rd., Atchison Co. To exceed $161,000. T. H. Culler, state hy. engr.

★**Mo., St. Louis**—H. C. Brenner Realty & Finance Co., 2804 Chippewa St., constructing rein.-con., steel double deck railroad and highway bridge across Mississippi River from Cherokee St., St. Louis Co. and Osage St., St. Clair Co. $5,000,000. U. S. War Dpt., Washington, D. C., approved plans. Noted Nov. 15, C.D.—Nov. 21, E. N.-R.

New York—Dpt. P. Wks., Albany, plans concrete bridge and concrete culverts on state highways in Steuben Co. To exceed $23,000. O. J. Dempster, 32 Church St., Hornell, engr.

N. Y., Canton—Bd. Supervs. St. Lawrence Co. bids in spring, constructing steel, concrete bridge between Canton and Potsdam, $125,000. P.W.A. funds allotted.

N. Y., Delhi—Bd. Supervs. Delaware Co. bids in spring, replacing 3 bridges in Franklin and Meredith, $31,000; one steel, concrete bridge between Delhi and Bloomville, $29,000; and 1 steel, concrete bridge in Franklin, $100,000. P.W.A. funds allotted.

N. Y., Elmira—Bd. Supervs. Elmira Co. bids in spring constructing bridge on county highway, ¼ mi. south of here. $218,000. P.W.A. funds allotted.

N. Y., Ithaca—Tompkins Co. bids in spring replacing old bridge with steel, concrete bridge between Ithaca and Dryden. $155,000. P.W.A. funds allotted.

N. Y., Rome—Bd. Supervs. Oneida Co., Utica, bids in spring replacing old bridge with steel, concrete bridge, here. $66,000. P.W.A. funds allotted.

N. Y., Tioga—Bd. Supervs. Tioga Co., bids in spring, constructing 2 bridges in Newark Valley, $63,000; bridges and concrete culverts in Richford and Berkshire, $28,000. P.W.A. funds allotted.

Pa., Reading—Reading R.R. Co., C. Dillenbeck, ch. engr., Reading Terminal, Phila., Berks County, State Hy. Dpt., Harrisburg, and City, revised plans for reconstruction of 5th St. bridge over tracks of Reading R.R. Co. $43,444. Project approved by P. Service Comn., State Hy. Dpt., Harrisburg, A. R. Brownmiller, deputy secy. of State, will receive bids for same about May 1. E. Clinton Weber, city engr., State Engineers and railroad company engrs.

Texas—State Hy. Comn., H. Hines, chn., Austin, soon takes bids constructing M.K. and T.R.R. and S.P.R.R. underpasses and concrete pavement on Hy. 66, WPGM 239-C, Bexar Co., $177,000; constructing G.C. and S.Fe. Ry. and C.R.I. and G. overpass, and concrete paving on Haslett Rd., Hy. 2, W.P.G.S. 947, Tarrant Co., $100,000. New P.W.A. project: widening 4 bridges on Hy. 64, between Carthage and Sabine River, Hy. 64, Control 247, Sect. 1, Panola Co., $37,000.

Texas — State Hy. Comn., H. Hines, chn., Austin, soon takes bids constructing bridge and roadway approaches, Hy. 81, S.P. Control 291-I, Gillespie Co., $34,000; T. and P. R.R. underpass and approaches, Fort Worth, Tarrant Co., $38,000.

Wash., Tacoma—Pierce Co. bids in June, 270 ft. concrete bridge near Soldiers Home. $73,000. F. R. Easterday, Court House, engr.

BIDS ASKED

Florida—Mar. 26, by State Road Dpt., C. B. Treadway, chn., J. H. Dowling, state hy. engr., Tallahassee, overpass grade crossing in West Palm Beach, Project WPGM 122, Palm Beach Co.

Ia., Nevada — Mar. 25, by Story Co., B. Dickey, aud., one 40x24 ft. I-beam bridge, concrete floor and abutments, and one 12x12x24 ft. rein.-con. box culvert; also 2,500 lin.ft. cor-

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†*Federal Government.*

Bridges, etc. (Continued)
rugated metal pipe, and 1.000 lin.ft. rein.-con. pipe. S. Steigerwalt, co. engr.

Louisiana — Mar. 25, by State Hy. Comn., Baton Rouge, constructing Pierre Part Bay Bridge and approaches, having 104 ft. I-beam hand-operated swing span on timber pile piers with concrete caps and 9 timber trestle approaches, each 19 ft. span on timber pile bents, on Paincourtville-Pierre Part Hy. on Route 170, Assumption Parish; constructing bridge across Bayou Nez Pique and approaches, consisting of 120 ft. I-beam hand-operated swing span on timber pile piers with concrete caps and combination I-beam concrete deck approach spans on creosote piles with concrete caps, asphalt plant bridging, surfacing, on Jennings-Iota Hy., Route 371, Project 1166, Jefferson Davis and Acadia Parishes.

Michigan—Mar. 26, by State Hy., Roosevelt Hotel, Lansing, constructing 2 rein.-con. abutments on treated pile foundations through girder span with ballasted deck for single track R.R., WPGH-X and 66-8-12C-1, Ontonagon Co.; preparing soil, furnishing and planting trees, shrubs and vines and miscellaneous items 0.87 mi. WPMH-77-6C-3, St. Clair Co.; 2 rein.-con. gravity abutments steel deck girder span 31 ft. R. W. 22 ft. 6 in. S. W., WPSO-B1 of 45-4-21C-1, Leelanau Co.

Minnesota—Mar. 27, by State Hy. Dpt., St. Paul, constructing 85 ft. through plate girder underpass, double track and paving 0.33 mi. State Project 19-62-24 Bridge 5560, WPGM 558-A, on Dale St., St. Paul; 3 span 127 ft. bridge and grading 0.344 mi. S.P. 32-32-29-3, Bridge 5402, WPGM, 275-D, Red Lake Falls, Red Lake Co.; 153 ft. concrete deck overhead S.P. 55-142-24-2, Bridge 5443, WPGM 529-G, Stearns Co.; 90 ft. truss span near Ada, S.P. 82-179-22, Bridge 5612, Norman Co.; concrete deck overhead of 3 spans, 4 mi. south of New Ulm, Brown Co.; 123 ft. concrete deck girder overpass, S.P. 100-130-23, Bridge 5399, WPGM 540-B, west of Minneapolis, Hennepin Co.; 3 span, 140 ft. steel, timber overhead bridge, S.P. 100-130-23, Bridge 5,400, WPGM 540, west of Minneapolis, Hennepin Co.

Nebraska—See "Streets and Roads."

New Jersey—Mar. 30, by State Hy. Dpt., Trenton, constructing grade crossing eliminations on Comly Rd. and D. L. & W. R.R. in Lincoln Park, Morris Co., consisting of 6 span overhead highway bridge crossing railroad, one span over Beaver Dam Brook, one pedestrian subway together with necessary approaches, incl. 1,500 cu.yd. excav., 180,000 lb. structural steel, 285,000 reinforcement steel; on Dewey Ave. and D. L. R.R. in Wharton, Morris Co., 7 span overhead bridge, 362 ft. long, with approaches, 572 cu.yd. excav., 202,000 lb. reinforcement steel, 250,000 lb. structural steel on Springfield Ave., Valley Rd. and D. L. & W. R.R., Berkely Heights, Morris and Union Counties, 12 span overhead highway bridge crossing railroad and Passaic River, 1,470 cu.yd. excav., 450,000 lb. reinforcing steel, 220,000 lb. structural steel. Noted Sept. 13, C. D.

New York—Mar. 26, by Henry Hudson Parkway Authority, Arsenal Bldg., Central Park, New York, furnishing, delivering toll equipment for Henry Hudson Parkway.

New York—Mar. 26, by Triborough Bridge Authority, 111 8th Ave., New York, paving Marginal Roadways from 19th to Boody Sts., Queens Connection of Triborough Bridge connecting Manhattan, Brooklyn and Queens Boros, Contr. 67, P.W.A. project.

★**New York**—Mar. 31, by State Hy. Dpt., Albany, constructing 85 ft. girder bridge on Glen Aubrey-Whitney Point Rd., S.H. 902, WPSS RC 3743, Broome Co., $53,724***70 ft. girder bridge on Greene-Oxford Rd. Part 2, S.H. 8002, RC 2374, ER-RC 3744, Chenango Co. $72,243; 20 ft. concrete slab bridge Culvert 37 on Underwood Rd. 32, 30 ft. I-beam Bridge 42, Emory-Wilcox Rd. 8, 50 ft. I-beam Culvert 13, Galatia-Pine Hill Rd. 15, two 20 ft. concrete slab Culverts 24 and 25, George-Carr Rd. 19; 20 ft. concrete slab Culvert 31, Willett-Texas Valley Rd., 10x7 ft. closed box Culvert 34, Merrils Creek Rd. 6, WPSO SS-36-6, Cortland Co. $54,686; 34 ft. concrete bridge on Poughkeepsie-City-Hooker Ave. Rd. WPMS 938-A, Dutchess Co. $111,922; 119 ft. girder bridge over Erie R.R. on Cemetery Rd., WPGS 959-A, SS36-12, Erie Co. $93,147; improving 0.55 mi. and grading 0.23 mi. North Hempstead Turnpike S.H. 9018, WPGM 541-B, Nassau Co. $251,740; graveling 1.63 mi. and grading 0.28 mi. incl. 36 rigid frame bridges on Lake Shore Parkway WPSO 977-A, Monroe Co. $93,905; eliminating grade crossing on Southern Parkway NRM A and 947-A, and improving Laurelton Parkway, Queens Co. $289,158; constructing 40 ft. I-beam bridge on Mecklenburg-Ithaca Rd. Part 2 and Enfield Center Ithaca Rd., Tompkins Co. $60,546; 83 ft. girder bridge and approach spans on Portchester Village-Main St., WPGM RC 3728, Westchester Co. $166,904. Total $1,247,975.

New York—Apr. 3, Transit Comn., 270 Madison Ave., New York, reconstructing bridge carrying tracks of Long Island R.R., Rockaway Beach Div., over 91st Ave. and carrying Myrtle Ave. over same R.R. both at Brooklyn Manor; and carrying 221st St. over tracks of Long Island R.R. North Side Div., Bayside and related structures in Queens Boro.

New York—Apr. 9, by Triborough Bridge Authority, 111 8th Ave., New York, constructing esplanade and landscaping along East River Dr., and Manhattan approach from East 92nd to East 125th Sts., for Manhattan Connection of Triborough Bridge, connecting Manhattan, Bronx and Queens Boros, Contr. 62, P.W.A. project.

Ohio—Mar. 31, by J. J. Jaster, Jr., dir. Hys., Columbus, reconstructing existing separated crossing with D. T. & I. R.R. Co. by grading, draining, brick paving, constructing rein.-con. slab superstructure on existing stone abutments 0.022 mi. D. T. & I. Overhead Bridge on Fountain Ave., Clark Co., $9,387; constructing grade crossing elimination with D. T. & I. R.R. Co. by grading, drainage, stabilized binder soil and calcium chloride road, and roadside improvement 2.045 mi. Sects G and H, Springfield Washington CH Rd., SH 197, SR 70, Clark Co., $54,287.

Virginia—See "Streets and Roads."

West Virginia—See "Streets and Roads."

Wisconsin — Mar. 27, by State Hy. Comn., Madsion, constructing Madison-Morningside Sanitorium Footpath, Janesville-Stoughton-Madison Rd., Dane Co. constructing six 25 ft. span, steel, concrete, timber Bridge 34, Wausau-North Co. line Rd., Marathon Co.; one 228 ft. high truss structure, Bridge 168, on Wheeler-Norton Rd., Dunn Co.; 9 substructure units and one 8 ft. slab span culvert for Boscovel Bridge, Grant and Crawford Counties; three structures Cooper, Buck Creek and Sugar Creek Bridges, on Lynxville-De Soto Rd., Crawford Co.

P. E. I., Charlotteburg — See "Earthwork, Irrigation, Drainage and Waterways."

LOW BIDDERS

★**Connecticut**—At office of J. A. Macdonald, comr., State Hy. Dpt., Hartford, Mar. 9, two 600 ft. steel arches on concrete piers and 28 plate girder approach spans over Connecticut River, between Middletown and Portland, involving 40,000 bbls. cement, 4,600 cu.yd. stone, 1,140,000 lb. deformed bars, 1,400,000 lb. steel in caissons, 2,513,000 lb. steel bearings, etc., substructure from Merritt, Chapman & Scott, 292 Pequot Ave., New London, and 17 Battery Pl., New York, $1,028,303; superstructure from Bethlehem Steel Co., 8th and Lehigh Sts., Bethlehem, Pa., $1,085,594. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

CONTRACTS AWARDED

Arkansas—State Hy. Comn., Little Rock, 2 span 68 ft., rein.-con. deck girder bridge, Benton Co., to Consolidated Constr. Co., 31st St. and Arkansas River, Tulsa, Okla., $77,953. Est. $100,000. Bids Feb. 27. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

Colorado—See "Streets and Roads."

Colorado—State Hy. Dpt., Denver, constructing bridge with gravel surface approaches on hy. between Strasburg and Anton, combined F.A.P. 351-F and Emergency Relief Project 12, Adams and Arapahoe Counties, to De Remer & Atchison, 3551 Blake St., Denver, $38,625. Bids Feb. 25, awarded Mar. 4. Noted Mar. 4, C.D.

Iowa—State Hy. Comn., Ames, bridges in Fremont and Mills Counties, to Duvall & McKinney, Logan, $8,600***bridge in same counties, to G. W. Condon Co., Grain Exch. Bldg., Omaha, Neb., $8,993***2 groups culverts in Scott Co., to Christie & Mills, Omaha, $15,674 and $21,385 respectively. Grand total $54,652. Bids Mar. 3, awarded Mar. 7. Noted Mar. 9, C. D.

Kansas —See "Streets and Roads."

Maine—State Hy. Comn., L. D. Barrows, ch. engr., Augusta, Millinocket Crossing under Bangor and Aroostock R.R., Millinocket, to Jos. P. McCabe, Inc., 509 East 1st St., South Boston, $45,439; Bragdon crossing over Boston & Maine R.R., Wells, to Bridge Constr. Corp., Augusta, $47,908. Bids Mar. 7, awarded Mar. 11. Noted Mar. 16, C. D.—Jan. 23, E. N.-R.

Mass., Pittsfield—City, A. B. Farnham, comr. P. Wks., City Hall constructing 2 rein.-con., steel bridges at Pomeroy and Columbus Aves., to Daniel O'Connell's Sons, Inc., 480 Hampden St., Holyoke, $51,222. Bids Feb. 21, awarded Mar. 5. **P.W.A.** Noted Mar. 2, C. D.—Jan. 16, E. N.-R.

Nebraska—See "Earthwork, Irrigation, Drainage and Waterways."

New York—Dpt. P. Wks., Albany, to O'Day & Ambrose, Inc., Binghamton, bridges in Chenango Co., $17,935; Delaware Co., $99,558; Chenango Co., $22,920***to G. A. Graham, Inc., Clifton, N. J., Rockland Co., $33,803*** to W. L. Collins, Hornell, Steuben Co., $51,032 ***to Cold Spring Constr. Co., Inc., Akron, Steuben Co., $34,987***to L. E. Cleghorn, Rochester, Tioga Co., $21,191***to Bero Eng. & Contg. Co., North Tonawanda, Tompkins Co., $105,673. Grand total $388,099. Bids Feb. 25. Noted Feb. 27, C. D.—Feb. 6, E. N.-R.

New York — Triborough Bridge Authority, 111 8th Ave., New York, paving Eastern Blvd., Bronx Connection Triborough Bridge Connecting

†*Federal Government.*

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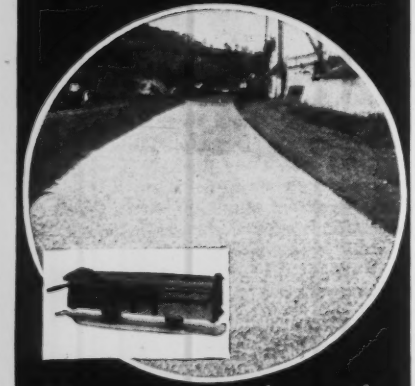

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Bridges, etc. (Continued)

Manhattan, Bronx and Queens Boros, Contr. 39, to J. Meehan & Son, 90 West St., New York, $87,575; Grand Central Parkway, extension, Contr. 63, to Mill Basin Asphalt Corp., East 54th St. and Avenue U, Brooklyn, $175,620. **P.W.A.** Bids Mar. 5. Noted Mar. 6, C. D.—Feb. 27, E. N.-R.

N. Y., Hoosick—Boston & Maine R.R. Co., W. J. Backes, ch. engr., Boston, Mass., eliminating Pease Grade Crossing, to S. A. Scullen Co., Inc., Remsen St., Cohoes, $48,958. Noted Jan. 24, C. D.—Jan. 30, E. N.-R.

N. Y., Schenectady—Foley Bros., general contractors, 135 East 42nd St., New York, 260 tons structural steel for bridge for eliminating Carman Street Grade Crossing, for New York Central R.R. Co., J. W. Pfau, ch. engr., 466 Lexington Ave., New York, to Phoenix Bridge Co., Phoenix, Pa. Noted Jan. 23, C. D.—Jan. 30, E. N.-R.

North Carolina — State Hy. & P. Wks., Raleigh, overhead crossing on U. S. Route 29, near China Grove, Project 6151, Rowan Co., to L. S. Bradshaw, Salisbury, $27,687. Bids Jan. 28. Noted Feb. 3. C. D.—Jan. 23, E. N.-R., under "Streets and Roads."

O., Cleveland—Great Lakes Exposition Co., A. N. Gonsoir, ch. engr., constructing steel timber substructure on East 9th St., to S. W. Emerson Co., 1836 Euclid Ave. Est. $40,000. Noted Feb. 5 C. D.—Feb. 13, E. N.-R.

Rhode Island—State Bd. Providence Plantations, Div. of Contrs., Standards & Purchases, State House, Providence, constructing Dairsville R.R. Bridge 369, Project WPGS 123, North Kingston, to Seabord Constr. Co., 434 Allens Ave., Providence, $99,735; 3 span deck girder bridge, Kingston Station R.R. Bridge 372, Project W.P.G.H. 47-C, South Kingston, to F. T. Westcott, 95 High St., North Attleboro, Mass., $117,369. Bids Feb. 17, awarded Mar. 10. Noted Feb. 24, C. D.—Feb. 13, E. N.-R.

Texas—G. Gilchrist, state hy. engr., Austin, T. and P. R.R. overpass, roadway and approaches, concrete pavement, Hy. 15, P.W.G.H. 634-B, Tarrant Co., to Cage Bros. & J. C. Ruby, Bishop, $129,898 est. $140,000***constructing P. and S. F. R.R. overpass and roadway approaches, Hy. 15, W.P.G.S. 827, Fisher Co., to Field Bros., Lubbock, 68,369 est. $75,000*** replacing section of Red River bridge, Hy. 30, E.R.P. 4, Sect. 3-H-C, Control 156-1-2, Wichita Co., to J. F. Buckner, Cleburne, $12,641 est. $13,000. Grand total $210,908. Bids Feb. 25. New **P.W.A.** Noted Mar. 3, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, constructing T. and N. O. R.R. underpass and approaches, Hy. 34, WPGH 385-E, and Control 172-5-6, Ellis Co., to Allhands & Davis, Southwestern Life Bldg., Dallas, $81,769. Est. $80,000. Bids Feb. 11. New **P.W.A.** Noted Feb. 18, C. D.

Texas—G. Gilchrist, state hy. engr., Austin, constructing T. and N. O. R.R. underpass, Hy. 6, W.P.G.M. 628-D and W.P.G.H. 628-B, Burleson Co., to Uvalde Constr. Co., Santa Fe Bldg., Dallas, $55,645. Est. $60,000. New **P.W.A.** Bids Feb. 12. Noted Feb. 21, C. D.

Washington—L. V. Murrow, dir. Hys., Olympia, constructing Okanogan River Bridge, 337 ft. long, rein.-con., Okanogan Co., to H. Hagman, Cashmere, $38,103. Noted Feb. 18, C. D. —Feb. 20, E. N.-R., under "Streets and Roads."

West Virginia—State Road Comm., Charleston, bridge, Kanawha Co., to Trojan Steel Co, 2 St. Albans Car Line, Charleston, $24,150***100 ft. pony truss, Tyler Co., to C. C. Dodd Constr. Co., Spencer, $16,430***two 50 ft. I-beam bridge superstructure, Tyler Co., to Roanoke Iron & Bridge Wks., Roanoke, Va., $17,437*** 350 ft. I-beam bridge, Wirt Co., to Keely Constr. Co., Clarksburg, $24,447***230 ft. bridge, Wyoming Co., to W. F. Adkins, Myra, $13,320. Grand total $95,784. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Wisconsin—State Hy. Comn., Madison, rein.-con. overhead structure in Dane Co., to Mid-State Constr. Co., 821 Miami Pass, Madison, $11,496***South Ninety-Second Street Overhead, Milwaukee Co., to Milwaukee General Constr. Co., 2121 South 13th St., Milwaukee, $51,027***30 ft. rein.-con. deck girder bridge and approaches in Fond du Lac Co., to Fox Valley Constr. Co., 303 West College Ave., Appleton, $22,884***superstructure and center pier bridge in Shawano Co., to Wisconsin Bridge & Iron Co., 5023 North 35th St., Milwaukee, $41,862***bridges in Monroe Co., to C. B. Taylor, Decorah, Ia., $37,444***Trempealeau Co., to Metzger & Son, Blair, $6,396***Pierce Co., to E. Blank, Cochrane, $18,472***Clark Co., to C. Starzardt, Athens, $18,677***Grant Co., to H. Turner & Son, Wauzeka, $4,784***bridges and 8 rein.-con. culverts in Grant and Lafayette Counties, to Eau Claire Eng. Co., Eau Claire, $55,279. Grand total $269,323. Bids Mar. 6. Noted Mar. 12, C. D.—Feb. 27, E. N.-R.

STREETS AND ROADS

BIDS ASKED

California — Apr. 1, by State Hy. Comn., Sacramento, plant mixed surfacing and constructing shoulders, involving 1,200 tons selected materials, 4,800 tons min. aggregate, 240 tons liquid asphalt MC-5, or MC-extra heavy; 45 tons same, MC-2, (prime coat), 30 tons same MC-3, (seal coat), 350 tons screenings, seal coat, on hy. between County Rd. to Byron and east boundary Contra Costa Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

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California — Apr. 2, by C. H. Purcell, State Hy. Dpt., 808 State Bldg., Los [illegible] grading, applying road mix surfacing [illegible] mi. hy. between Box Springs and point 3 [illegible] of Moreno, Riverside Co., 239,400 cu.yd. to exceed $23,000; asphaltic concrete pa[illegible] mi. Champan Ave. and Glassell St., [illegible] of Orante, Orange Co. C. H. Purcell, 80[illegible] State Bldg., Los Angeles, engr.

Connecticut—Mar. 23, by State Hy. [illegible] A. Macdonald, state hy. comr., Hartfor[illegible] minous macadam paving 807 ft. W[illegible] Ave., Hamden; waterbound macadam [illegible] 12,042 ft. Foot Hills and Coe Rds., D[illegible] 6,424 ft. Crystal Lake Rd., Ellington; [illegible] ft. Riverside and Botsford Hill Rds., N[illegible] 8,800 ft. Battle St., Somers.

Conn., Bridgeport—See "Contracts Awarded."

Florida—Mar. 26, by State Road Dpt., C. B. Treadway, chn., J. H. Dowling, state hy. [illegible] Tallahassee, concrete paving 3.776 mi. Rd. 2 F.A.P. 94-Reopened, Polk Co.

Illinois—See "Contracts Awarded."

Indiana—Apr. 7, by State Hy. Comm., Indianapolis, rein.-con., bituminous concrete or rock asphalt paving 0.482 mi. State Rd. 12, Garry, Lake Co.; rein.-con. paving 2.30[illegible] mi. State Rd. 12, Gary, Lake Co.; 0.456 mi. state Rds. 46 and 37, North Walnut St., in Bloomington, Monroe Co.; rein.-con. and rock asphalt paving 2.254 mi. State Rd. 27, from Murray and Clinton Sts. to south city limits, in Fort Wayne, Allen Co.; 2.326 mi. State Rd. 3 New-castle North, Newcastle, Henry Co.; bituminous retread surfacing 2.806 mi. State Rd. 60, re-location at Borden, Clark Co.; bituminous surface treating and stone or gravel surfacing 13.462 mi. Feeder Road, Jamestown to Thorntown, Boone Co.; rock asphalt surfacing 1.98[illegible] mi. State Rd. 15, Wabash to point 2 mi. north-west, Wabash Co. M. R. Keefe, state hy. engr.

Ia., Orange City—Mar. 24, by Sioux Co., M. J. Van Wyk, aud., grading 88 mi. local county roads, incl. 880,000 cu.yd. side cast earth excav. K. L. Seliger, co. engr.

Kansas—Mar. 27, by State Hy. Comm., at office of County Clerk, Wichita, roadside improvement, bituminous mat surfacing, light type surfacing, earthwork, culverts, bridges, concrete and brick paving, asphalt paving, curbing, guttering 50.892 mi. hys. in Sumner, Butler, Edwards, Pawnee, Reno, Rush and Scigwick Counties.

Louisiana—Mar. 25, by State Hy. Comm., Baton Rouge, concrete paving 0.718 mi. Bogalusa-Pearl River Hy., Route 35, Project 685[illegible] F.A.P. 49-A, reopened. Washington Parish; grading, gravel surfacing 7.27 mi. Quitman-Beech Springs School Hy., Routes 545 and 547, Project 1134, Jackson Parish; 4.3 mi. Intersection Route 23-Intersection Route 576, Hy. on Route 575, Project 1132, Evangeline Parish; 6 mi. Mamou-Fenris Intersection Route 221 Hy. on Route 570, Project 1119, Evangeline Parish; 3 mi. Dodson-Winn-Jackson Parish line hy. on Route 1200, Project 899-A, Jackson Parish; grading, drainage structures 8.277 mi. Lydia-Weeks Island Hy., Route 157, Project 1014, Iberia Parish.

Louisiana—State Hy. Comn., Baton Rouge, rejected bids Jan. 15, grading, drainage structures 5 mi. Weeks Island-Lidia Rd., Route 157, Project 1109, Iberia Parish. Noted Jan. 23, C.D.—Jan. 9, E.N.-R.

†Md., Cheltenham — Mar. 25, by Yards & Docks, Navy Dpt., Wash., D. C., grading, surfacing road, pipe culverts and timber bridge supported on concrete abutments and pile bents, at Naval Radio Receiving Station, Spec. 8169.

Minnesota—Mar. 27, by State Hy. Comm., St. Paul, concrete paving 0.5 mi. State Project 53-11-48 F.A.P. 524-A; 1 mi. S.P. 61-3[illegible] F.A.P. 283 between ½ mi. and 1½ mi. east of Frontenac; grading 12.6 mi. between Spencer and point 12 mi. south, S.P. 72-72-23 F.A.P. 521-A, incl. 278,328 cu.yd. excav.

Minnesota—Mar. 27, by State Hy. Dpt., St. Paul, grading, graveling 5.6 mi. State Project 4-4-55-1A, B and C, WPSS 546C and WPMS 546B, between Merle Grove and point 3 mi. south of Greenwold, incl. 116,182 cu.yd. excav.; 6.9 mi. S.P. 6-137-22-1A and B, WPSS 537A and WPMS 537D, between Crosby and 6 mi. north, 339,579 cu.yd. excav.; 1.6 mi. S.P. 34-162-21-1, WPSS 534A, southeast of Remer and east Cass Co. line, 104,210 cu.yd. excav.; 8.1 mi. S.P. 34-162-21-2, WPSS 544B, between West Aitkin Co. line and Hill City, 201,254 cu.yd. excav.; 4.3 mi. S.P. 39-88-25-2 A and B, WPGM 564C and WPGS 564D, between Jacobs and Ihlen, 88,757 cu.yd. excav.; 4.2 mi. S.P. 60-85-22-2B, WPGH 523A, between Worthington and point 2 mi. southwest of Brewster, 129,271 cu.yd. excav.; 8.4 mi. S.P. 60-85-23-1B, C and D, WPGM 523 and WPGH 523C, between Heron Lake and point 1 mi. east of Wilder, 207,787 cu.yd. excav.; 14 mi. S.P. 6-34-26-1A and B, 3 and 2A, WPMH 368E and WPH 368D, F and G, between Remer and point 2.5 mi. northeast of west Otasca Co. Line, 651 cu.yd. excav.; 3.3 mi. Project 56-04 WPSO 691 and WPMS 691B between Vergas and point 3 mi. north west, Otter Tail Co., 102,926 cu.yd. excav.; 9.3 mi. Project 73-01, WPSO 712A and WPMS 712B, between State Aid Rd. 20 and S.A.R. 1, Stearns Co., 9,946 cu.yd. excav.

★ **Nebraska**—Mar. 26, by State Hy. Comm., Lincoln, grading, paving, culverts and 1

†*Federal Government.*

Streets and Roads (Continued)

viaduct on U. S. Hy. 30-S near Waterloo, Douglas Co., on Holdredge St., Lincoln, Lancaster Co.; grading, culverts 4 mi. Hy. 34 between York and Seward, Seward Co.; 1.3 mi. Hy. 2 between Merna and Dunning, Blaine Co.; grading, graveling, culverts and 1 bridge on secondary highway between Lynch and Holt Co. line, Boyd Co.; grading, graveling, culverts on secondary highway between Amelia and Nebraska Hy. 11, Holt Co.; grading, culverts and 2 bridges on 6.3 mi. Hy. 40 between Callaway and Arnold; and grading, culverts 3.1 mi. on Federal secondary highway between Miller and Ansley Rd., both Custer Co.; grading, culverts 1 bridge 1.2 mi. Hy. 23-N between Curtis and Moorefield, Frontier Co.; on Hy. 19, between Sidney and Colorado State Line, Cheyenne Co.; 2.4 mi. Hy. 29, Kimball and Colorado State Line, Kimball Co.; 1.7 mi. secondary highway between Creighton and O'Neill Rd., Knox Co.; grading, graveling 3 mi. Hy. 105, between Johnson and Humboldt Co., Nemaha Co.; grading 6.3 mi. Hy. 20, between Royal and Plainview, Antelope Co.; culverts on Nebraska Hy. 92, between Wakefield and Pender, Wayne Co.; 5 mi. Federal secondary highway between Winside and Belden, Wayne Co.; grading, graveling, culverts on road between Butte and Atkinson Rd., Boyd Co.; grading 1.9 mi. secondary highway between Greeley Center and Ericson, Greeley Co.; 4 bridges on Hy. 2, between Ansley and Broken Bow, Custer Co.; roadside improvement on Hy. 34, between Eagle and Elmwood, Cass Co.; Hy. 30, between Fremont Blair, Washington Co.; Hy. 8, between Hooper and West Point Dodge Co.; Hy. 20, between Valentine and Arabia Rd., Cherry Co.; Hy. 2, between Hemingford and Crawford, Dawes Co.; Hy. 30, between Bushnell and Kimball, Kimball Co, $580,000. A. C. Tilley, Lincoln, state hy. engr.

New York—See "Bridge and Grade Crossings."

N. Y., New York—Mar. 26, by S Levy, pres, Manhattan Boro, Municipal Bldg., laying and relaying sidewalks, curbing, and sheet asphalt repaving, when and where directed in Manhattan Boro.

★ **Ohio**—Mar. 31, by J. J. Jaster, Jr., dir. Hys., Columbus, grading, drainage, hot mixed, hot laid asphaltic concrete paving, roadside improvement 0.772 mi. Sect, Shadyside of Ohio River Rd. SH 7, SR 7, Belmont Co., $46,667*** grading, drainage, concrete widening hot mixed, hot laid asphaltic concrete paving, roadside improvement 0.309 mi. Sect, Washington CH Columbus Washington CH Rd., SH 50, SR 3, USR 62, Fayette Co., $43,284***0.929 mi. Dayton Germantown Rd., SH 65, SR 4, Montgomery Co., $79,954*** grading, drainage, concrete paving 1.962 mi. Sects, B and I of Pomeroy Jackson Rd., SH 395, SR 143 and constructing timber bridge steel-beams for side road drive and roadside improvement Sect. M, Millersport McArthur Rd., SH 163, SR 143, Meigs Co., $139,167***grading, drainage, brick paving, roadside improvement 0.373 mi. Sects, Dayton and F of Dayton-Troy Rd., SH 61, USR 25, Montgomery Co., $58,032***grading, drainage, widening pavement rein.-con. and hot-mixed, hot laid asphaltic concrete resurfacing 0.341 mi. Sect, Zanesville of National Hy., SH 1, USR 40, Muskingum Co., $29,703***grading, brick on rein.-con. paving 1.362 mi. Sects. H and A, Portsmouth-Columbus Rd., SH 5, USR 23, Ross Co., $71,689***brick paving 1.285 mi. Sect, Portsmouth-New Boston of Ohio River Rd., SH7, USR 52, in cities Portsmouth and New Boston, Scioto Co., $105,163***grading, drainage, brick and surface treated macadam paving 3.608 mi. Sect, B, Osnaburg-Minerva Rd., SH 493, USR 30, and constructing rein.-brick bridge, brick faced concrete superstructure, concrete footing and concrete caps on pier and abutments, Br. No. ST-30-277, Stark Co., $334,489***grading, drainage, widening, new and salvage brick surface course paving, roadside improvement 2.646 mi, Sects, M and P, Youngstown-Warren Rd., SH 80, USR 422, Trumbull Co., $294,640***cold mixed, cold laid asphaltic concrete paving 0.313 mi. Sect, Upper Sandusky-Marion-Upper Sandusky Rd., SH 113, USR 23, Wyandot Co., $10,154, Total est. $1,212,942.

Oklahoma—See "Contracts Awarded."

Pennsylvania — Mar. 27, by W. Van Dyke, secy. Hys., Harrisburg, rein.-con. paving, rein.-con. bridge 7,986 ft. R-854, Sect. R-3, Cambria Twp., Ebensburg Borough, Cambria Co., involving 85,506 cu.yd. Class 1 and 1,075 cu.yd. Class 2 excav.; bituminous on native stone surfacing 7,780 ft. R-17038, Sect. 1, Lawrence and Boggs Twp., Clearfield Co., 308 cu.yd. Class 2 excav.; 9,410 ft. R-40003, Sect. 1, Hazleton and Hazel Twp., Luzerne Co., 8,298 cu.yd. Class 1 and 494 cu.yd. Class 2 excav.; 21,319 ft. Route 18, Point and West Chillisquaque Twps., Northumberland Co., 2,764 cu.yd. Class 1 excav.; plain concrete curb type guttering 420 ft. R-241, Tunkhannock Boro, Wyoming Co.; extending existing stone masonry arch, and widening existing pavement, R 415 and 283, Catawissa Twp., Cambria Co., 2,105 cu.yd. Class 1 and 180 cu.yd. Class 2 excav.

Virginia—Mar. 31, by State Hy. Dpt., Richmond, macadam surface treating 0.2 mi. Route 11, State Project WPMH 361-M1, Fed. Project WPMH 536-B, Smyth Co., incl. 6,290 cu.yd. excav.; 0.8 mi. Route 60, State Project 655-C1-2, Fed. Project 384-I, Amherst Co., 9,992 cu.yd. excav.; 1.1 mi. Route 234, State Project WPSS 1111-A, Fed. Project WPSS 611-A, Prince William Co., 10,497 cu.yd. excav.; 0.3 mi. Route 71, State Project WPMS 1313-M1, Fed. Project WPMS 548-A, Pulaski Co., 1,474 cu.yd. excav.; macadam paving 0.2 mi. Route 11, WPMH 645-M2, Fed. Project WPMH 340-D, Harrisonburg, 1,408 cu.yd. excav.; grading, draining 0.2 mi. Route 94, WPMS 665-M1, Fed. Project WPMS 596-A, Fries Co., 3,789 cu.yd. excav.; graveling 0.09 mi. Route 12, State Project WPMH 1359-M2, FA-1359-M1, Fed. Project WPMH 31-B, FA-31-C, Cape Charles Co.; 1,462 ft. bridge over New River, Radford, Route 11, State Project 1132-B1, Fed. Project 449-F, Pulaski Co.

Wash., Spokane—Mar. 26, by W. H. English, Comnr., P. Wks., asphalt paving Providence St. to Gordon St. and vicinity, $4,880; 15th St. from Division to Wall Sts., $7,070; Knox St. from Ash to Belt Sts., $5,315; Mission St. from Cedar to Nettleton Sts., $11,000; Sinto St. from Washington to Monroe Sts., $9,500; Sinto St. from Chestnut to Nettleton Sts., $2,020; Stevens St. from Cedar to Nettleton Sts., $4,475; Standard St. from Mission to Sinton Sts., $1,135, 11th St. from Napa to Perry Sts., $6,260; 12th St. from Napa to Perry Sts., $6,600; 9th St. from Sherman St. 400 ft. west, $1,030; Alace St. from Northwest Blvd. to Wellington Pl., $3,720; Montgomery St. from Monroe to Ash Sts., $7,270; Mallon St. from Monroe to Ash Sts., $13,760; Tepoa St. from Manito to 25th Sts., $5,550. Total $89,585. T. Ingles, City Hall, engr.

West Virginia—Mar. 24, by State Rd. Comn., Charleston, grading, draining, concrete paving 1.063 mi. Smithburg Relocation Grade Crossing elimination, U. S. Wks. Project WPGH 185-E, Doddridge Co.; stone base and surface treatment 1.86 mi. Flatwoods-Fry Rd., U. S. Wks. Project WPSO 267, Kanawha Co.; surface treatment 7.668 mi. Franklin-Virginia State Line Rd., U. S. Wks. Project P.W.S. Docket 2197-851-A revised, Pendleton Co.; asphaltic concrete paving 4.412 mi. Bruceton Mills-Penna State Line Rd., U. S. Wks. Project P.W.S. Docket 2197-189-A, Preston Co.; road mix surfacing 6.32 mi. Spencer Bright Rd., U. S. Wks. Project P.W.S. Docket 2197-854-B, Roane Co.; 6.891 mi. same road, U. S. Wks. Project P.W.S. Docket 2197-854-B; 6.347 mi. Davis Randolph Co. Line Rd., U. S. Wks. Project P.W.S. Docket 2197-867, Tucker Co.; constructing 63 ft. span and one concrete twin box culvert, incl. grading, draining, concrete paving of approaches U. S. Wks. Project W.P.G.S. 258, Wetzel Co.

Wisconsin — Mar. 27, by State Hy. Comn., Madison, concrete paving 0.246 mi. Columbus-Lowell Rd. (Etscheid Curve), Dodge Co., incl. 3,936 cu.yd. excav.; grading, draining, sidewalks, 2,646 mi. Jonesville-Stoughton-Madison Rd. (Madison-Morningside-Sanitarium footpath), Dane Co., 3,232 cu.yd. excav.; 3,798 mi. DePere-Green Bay Rd., Brown Co., 21,317 cu.yd. excav.; grading, concrete paving 7.048 mi. New Lisbon-Sparta Rd. (Tomah Sparta), Monroe Co., 19,957 cu.yd. excav.; 7,391 mi. Whitehall-Ettrick U.S. Hy. 53, Trempealeau Co., 7,724 cu.yd. excav.; draining, grading, graveling 12.884 mi. Milton-Johnstown Center-East Co. line Rd., Rock Co., 20,085 cu.yd. excav.; 1.321 mi. City Streets-Oconto Falls (Main Washington and Quincy Sts.), Oconto Co., 5,202 cu.yd. excav.; 1.063 mi. City Streets-Oconto Rd. (Cook Ave. and Pecor St.), Oconto Co., 4,533 cu.yd. common excav.; 0.765 mi. Village Streets (Gillett, Cemetery School, Richmond and Kasten Sts.), Oconto Co.; top soil base course and graveling 5.094 mi. East County Line-Nashkoro Rd., Marquette Co.; 3.143 mi. Laona-Michigan State Line Rd., (Cavour-Goodman), Forest Co.; crushed stone surfacing 6.77 mi. Monticello-West County Line Rd., Green Co.; 1.136 mi. Westby-LaCrosse Rd. (Westby-Coon Valley), Vernon Co.; grading, draining, crushed stone surfacing Elm St., Lancaster, Grant Co.; grading 0.906 mi. Madison-Wisconsin Dells Rd. (County Trunk W, Lyons Corners), Sauk Co., 58,157 cu.yd. common excav.; 6.178 mi. Johnson-Creek-Watertown River Rd., Jefferson Co., 51,345 cu.yd. excav.; 3.798 mi. DePere-Green Bay Rd., Brown Co., 21,317 cu.yd. excav.; 0.712 mi. Waupaca-Wild Rose Rd., Waupaca Co., 21,909 cu.yd. excav.; grading, 6 rein.-con. culverts on 5.094 mi. East County Line-Neshkoro Rd., Marquette Co., 203,006 cu.yd. excav.; 1.369 mi. Clintonville-Rosholt Rd., Clintonville-Big Falls Rd., Waupaca Co., 9,352 cu.yd. excav.; 1.079 mi. Wausau-North County Line Rd., Marathon Co., 69,996 cu.yd. excav.; 1.136 mi. Westby-LaCrosse Rd. (Westby-Coon Valley Rd.), Vernon Co., 74,952 cu.yd. excav.; 1.169 mi. Wheeler-Norton Rd., Dunn Co., 52,147 cu.yd. excav.; 1.578 mi. Laona-Michigan State Line Rd. (Cavour-Goodman), Forest Co., 99,842 cu.yd. excav.; grading, drainage structures and graveling 1.975 mi. S.T.H. 27, Exeland-Lemington Rd., Sawyer Co., 26,300 cu.yd. excav.; grading, draining 2.381 mi. Superior-Black River Falls Rd., Douglas Co., 16,656 cu.yd. borrow; 0.293 mi. Elm Street, Lancaster, Grant Co.

†**Alaska**—Apr. 2, by Pub. Rds., Juneau, surfacing 4.9 mi. Petersburg-Cannery Section, Mitkof Hy., Tongass Natl. Forest, M. D. Williams, Juneau, dist. engr.

CONTRACTS AWARDED

Alabama—State Hy. Dpt., Montgomery, grading, drainage, chert surfacing 7.192 mi. Scotts-

†*Federal Government.*

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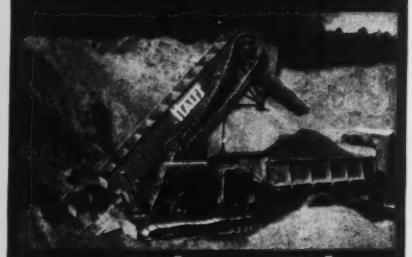

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Streets and Roads (Continued)

boro-Stevenson Rd. WPH 37-B, Jackson Co., to Clarke, Kearney & Stark, Piedmont, $140,859. Bids Dec. 13. Noted Dec. 27, C. D.—Jan. 2, E. N.-R.

†**Arizona** — Pub. Rds., Phoenix, base course surfacing 12.696 mi. road in Coconino Co., to Lee Moor Contg. Co., El Paso, Tex., $73,787. Est. $85,241. Bids Feb. 27. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

Calif., Los Angeles — Supervs. Los Angeles Co., grading, asphaltic concrete paving 0.77 mi. Cedar Ave., north line of Tract 9901 to 190th St., Torrance, to Geo. R. Curtis Paving Co., 2440 East 26th St., $31,593. Bids Feb. 10. Noted Feb. 18, C. D.—Jan. 30, E. N.-R.

Colorado—State Hy. Dpt., Denver, gravel surfacing 1.682 mi. hy. between Brush and Hillrose on State Hy. 2, F.A.P. 288 AR 3, Morgan Co., to Monaghan & Kenney, 332 South Race St., Denver, $40,362. Bids Feb. 25.

Colorado—State Hy. Dpt., Denver, gravel surfacing 2.695 mi. hy. between Montrose and Ouray, State Hy. 12, W.P.M.H. 293-D, Montrose Co., to E. Selander, Greeley, $101,034; constructing Platt River Bridge and approaches 1.058 mi. hy. between Greeley and LaSalle, State Hy. 2, Weld Co., to M. E. Carlson, 4483 Newton St., Denver, $171,545. Bids Mar. 3. Noted Mar. 9, C. D.—Feb. 27, E. N.-R.

Connecticut—J. A. Macdonald, state hy. comr., Hartford, rolled bank run gravel surfacing 19,912 ft. sections hy., Cornwall, to John De Michael & Bros., 58 High St., Torrington, $43,801. Noted Dec. 13, C. D.

Conn., Bridgeport — City, improving Eckert St. to Trumbull line, $94,466***2,000 ft. Wayne St., $10,981***bituminous macadam paving 600 ft., and curbing 8,000 ft., 4 catch basins, Seaside Park, $20,730. W.P.A. labor. Grand total $126,177. P. Brewster, dir.

★ **Illinois** — Dpt. P. Wks. & Buildings, Div. Hys., Springfield, grading, draining, concrete surfacing scenic highway along Mississippi River between Alton and Grafton, relief labor, $2,500,000. **W.P.A.** funds allocated. C. H. Sheppard, 1250 State St., East St. Louis, Ill., engr.

Ill., Galesburg—Knox Co., grading, drainage structures, graveling 10.767 mi. Abingdon-De-Long Rd., to Ferguson Constr. Co., Rockford, $81,324. **P.W.A.** Bids Jan. 14. Noted Jan. 7, C. D.

Indiana — State Hy. Comn., Indianapolis, waterbound macadam and bituminous paving 14.952 mi. road in Montgomery Co., to McMahan Constr. Co., Rochester, $181,652. Est. $202,623. Bids Jan. 7. Noted Jan. 10, C. D.

Indiana — State Hy. Comn., Indianapolis, graveling 5.782 mi. road in Hendricks and Boone Counties, and 5.803 mi. road in Boone Co., to G. B. Barr, Rochester, $44,891 and $50,048 respectively, est. $64,160 and $65,899 respectively. Bids Dec. 17. Noted Feb. 28, C. D.—Mar. 5, E. N.-R.

Iowa — State Hy. Comn., Ames, graveling 2.175 mi. Black Hawk Co., to McKenzie & Holm, Waterloo, $6,856***paving 4.988 mi. Scott Co. and 2.973 mi. Scott Co., to McKenzie & Holm, Inc., Waterloo, and to Burch Constr. Co., Cedar Rapids, $117,117 and $86,322 respectively. Grand total $264,295. Bids Mar. 3, awarded Mar. 7. Noted Mar. 9, C. D.

Kansas—State Hy. Comn., Beloit **(P. means Project)**, earthwork and culverts 0.154 mi. P. 81-23-WPMH 186-E, Cloud Co., to H. J. Taylor Constr. Co., Salina, $28,190***5.37 mi. P. 14-19-FA 467-C, Mitchell Co., to List & Clark Constr. Co., Railway Exchange Bldg., Kansas City, Mo., $59,364***roadside improvement 0.232 mi. P. 14-15A-WPMH 445-A, and 1.122 mi. P. 14-15A-WPH 445-B, both in Ellsworth Co., to Lawson Landscape Service, McPherson, $709 and $1,72[illegible] respectively***2.447 mi. P. 81-16-WPH 44-ABE, Saline Co., to Kansas Landscape & Nursery Co., Salina, $9,858***4.172 mi. P. 59-S-27-WPH 216-A, Marion Co., to Chandler Landscape & Floral Co., 101 West 47th St., Kansas City, Mo., $2,300***resurfacing 19 mi. P. 57-1-6726, Geary Co., and 2.1 mi. P. 57-2-6727, Morris Co., to B. Metzger, Ozawkie, $6,574 and $727 respectively***0.047 mi. channel change and jetty construction P. 15-19B-FA 377-A, Clay Co., to D. L. Wheelock Constr. Co., Clay Center, $8,732***Bridge 2.5, five 30 ft. rein.-con. deck girder spans, P. 14-19-FA 467-C, Mitchell Co., to Hopper Constr. Co., Garden City, $15,471. Grand total $133,645. Bids Mar. 3. Noted Feb. 26, C. D.

Kansas—State Hy. Comn., Great Bend **(P. means Project)**, to W. H. Harris, Manhattan, resurfacing 14 mi. P. 4-4-6730, $3,696; 9 mi. P. 4-2-6728, $2,448; 4.3 mi. P. 4-3-6729, $1,170; 3 mi. P. 96-13-6735, $840, all foregoing Barton Co.; 3. mi. P. 96-12B-6733, Rush Co., $840***to Grant A. Stannard, Wichita, 8 mi. P. 13-1-6745, Butler Co., $3,152; 5 mi. P. 42-6-6741, Sedgwick Co., $1,740; 3 mi. P. 49-5-6737, $1,068; 7 mi. P. 160-28-6739, $2,002; 6 mi. P. 55-1-6740, $1,224; 1 mi. 15-5-6743, $204***to W. F. O'Brien, St. Paul, 8.2 mi. P. 49-2-6736, $3,182, all foregoing in Sumner Co. ***to De Soto Kaw River Sand Co., Lawrence, 4.5 mi. P. 4-5-6731, $1,134; 11.2 mi. P. 4-6-6732, $2,822***to C. Hulme, Great Bend, 1 mi. P. 14-13B-6734, $208; 9 mi. P. 14-13A-6746, $1,872, all foregoing in Rice Co.***to Cook & Cone, Ottawa, 13 mi. P. 42-7-6742, $4,030; 12.7 mi. P. 15-8-6744, $3,175, both in Sedgwick Co.***to M. W. Watson, National Bank of Topeka Bldg., Topeka, 3.5 mi. P. [illegible] 8094, Cowley Co., $910; sand gravel cover material 15.5 mi. P. 54-17-6750, [illegible] 2 mi. P. 54-18A-6751, $422; 7.5 mi. P. 54-18E-6752, $1,584; 5 mi. P. 54-19-6753, all foregoing in Pratt Co.; 15.3 mi. P. [illegible] 6749, Kiowa Co., $3,133***to D. G. [illegible] Logan, 9 mi. P. 160-24-6755, $1,956; [illegible] P. 160-23-6754, $618; 4 mi. P. 14-1[illegible] $823; resurfacing 8 mi. P. 44-5-6738, [illegible] all foregoing in Harper Co.***to E. Gr[illegible] Mt. Hope, sand graveling for cover [illegible] 16.5 mi. P. 96-21-6757, $1,805***to St[illegible] & Tidd, Hutchinson, roadside improvement [illegible] mi. P. 81-7-130 ABZ, $2,675, both in Sedgwick Co.***to Cook Gardens, Ottawa, 0.64 [illegible] P. 160-28-WPH 368-G, $469; 0.113 mi. P. 160-28-WPMH 368-G, $5,752, both in Sumner Co. ***to Hopper Constr. Co., Garden City, [illegible] paving and bituminous filled brick [illegible] 0.114 mi. P. 8-12-WPMH 389-E, Barton Co., $8,485. Grand total $71,708. Bids Feb. 25. Noted Feb. 18 and 26, C. D.—Feb. 20, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, **(P. means Project)**, grading, surfacing [illegible] mi. Factory Rd., P. 1163, St. Tammany Parish, to R. B. Tyler Co., 1446 Levering St., Louisville, Ky., $15,267***1.678 mi. P. Int. Route 77-Bayou Chegby Hy., P. 974-A, Lafourche Parish, to Le Blanc Bros., St. Gabriel, $[illegible] ***3.626 mi. Bayou Des Glaises Rd., P. 1152, and 1.429 mi. P. Int. Route 299-Grand Ecore Hy., P. 1162, Avoyelles Parish, to T. W. Kleppeter, Baton Rouge, $13,092 and $3,907 respectively***3.533 mi. Gansville-East Hy., P. 1158, Winn Parish, to Deloney & Tatum, Dubach, $15,813***4.05 mi. Int. Route 8-Kennonwood Hy., P. 1161, Caddo Parish, to E. L. McCan, Shreveport, $12,030***surfacing 1.089 mi. Richland-Polland School Hy., P. 1156, Rapides Parish, to C. J. Martin, Alexandria, $[illegible] Grand total $69,597. Bids Feb. 26. Noted Mar. 5, C. D.—Jan. 23, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, grading, gravel surfacing 9 mi. Serena-Boggy Bayou Hy., Route 116, Project 1121, Catahoula Parish, to Nelson Bros., Baton Rouge, $68,348. Bids Jan. 29. Noted Feb. 10, C. D.—Jan. 16, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, H. B. Henderlite, state hy. engr. **(P. means Project)**, grading, surfacing 3.711 mi. Grangeville-Int. Route 103, P. 945-A-1, St. Helena Parish, to N. Cardinal & Co., Plaquemine, $[illegible] 291***4.676 mi. Transylvania-Waddill Hy., P. 1057, East Carroll Parish and 3.388 mi. Int. Route 401-Iberia Parish line Hy., P. 1140, St. Martin and Iberia Parishes, to Louisiana Materials Co., Inc., 1510 Julia St., New Orleans, $13,398 and $14,532 respectively***5.546 mi. Stella Beach-Ysclosky-South Hy., P. 1067, St. Bernard Parish and 8.845 mi. Bethel Church-Westport Hy., P. 1099, Rapides Parish, to T. L. James & Co., Inc., Ruston, $25,622 and $32,756 respectively***8.41 mi. Washington-Randall Hy., P. 1139, St. Martin Parish, to Barber Bros. Constr. Co., Inc., Baton Rouge, $36,043***3.738 mi. St. Mary Hy., Group 1, P. 1141, St. Mary and Iberia Parishes, to Huth Constr. Co., Inc., Franklin, $10,477***10.42 mi. Tensas Hy., Group 3, P. 1145, Tensas Parish, to J. C. Leathers, Alexandria, $36,654. Grand total $175,773. Bids Feb. 12. Noted Feb. 21, C. D. —Jan. 23, E. N.-R.

Louisiana—State Hy. Comn., Baton Rouge, roadside improvement 1.96 mi. Project 4231, Madison Parish, to Lambert Landscape Co., Shreveport, $6,336***grading, gravel surfacing 3 mi. Project 892-A, Ouachita Parish, and 2.7 mi. Project 1041, Richland Parish, to T. L. James & Co., Ruston, $39,785 and $13,238 respectively***4.8 mi. Project 1117, Iberville and Point Coupee Parishes, to Le Blanc Bros., St. Gabriel, $10,853***grading, shell surfacing 3 mi. Project 1149, Plaquemine Parish, to A. A. Buras & J. W. Bick, 2339 Valmont St., New Orleans, $28,518. Grand total $98,723. Bids Feb. 19. Noted Feb. 27, C. D. — Feb. 13, E. N.-R.

Maryland—State Roads Comn., Baltimore, grading, drainage 3.75 mi. along Hagerstown-Myersville, Frederick Rd., Contr. W-188-623, Washington Co., to Roberts Paving Co., Salisbury, $129,415; 4.78 mi. dual highway along Annapolis Blvd. relocation from point near Marley Station to Robinson, Anne Arundel Co., to C. J. Langenfelder & Sons, Rosedale, $114,261. **P.W.A.** Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

Maryland—State Roads Comn., Baltimore, concrete surfacing for approaches to proposed Penn. R.R. overhead grade elimination at Harmon on Harmon Dorsey Rd., Anne Arundel Co., to Roberts Paving Co., Salisbury, $92,070*** traffic bound macadam paving 1.47 mi. along Denton Hobbs Station Rd., Caroline Co., to Phillips Bros., Salisbury, $16,766***concrete surfacing 0.42 mi. for approaches to Penn. R.R. underpass grade elimination at Edgewood, Harford Co., to Arundel Constr. Co., 910 Trinity St., $41,797. Grand total $150,639. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Nevada—State Hy. Comn., Carson City, improving 5.39 mi. road in White Pine Co., to U. B. Lee, 1059 Carpentier St., San Leandro, Calif., $48,732. Bids Feb. 29. Noted Feb. 27, C. D.

N. J., Plainfield—City, constructing new roadway on East 5th St., from Watchung Ave. to Richmond St., to T. Gallo, 242 Madison Ave., Irvington, $30,346. Est. $54,545. P.W.A. Noted Mar. 3 C. D.—Mar. 5, E. N.-R.

N. J., Toms River—Ocean Co., 5½ mi. gravel road on Long Beach Island between Harvey

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†*Federal Government.*

Streets and Roads (Continued)

Cedars and Barnegat City, to Monihan Constr. Co., Ocean City, $32,544.

New York—See "Bridges and Grade Crossings."

N. Y., New York—S. Levy, pres. Manhattan Boro. Municipal Bldg., widening, sheet asphalt repaving Bank St. and asphalt repaving 4th Ave., to C. D. Beckwith, Inc., Seneca Ave. and Edgewater Rd., $12,493 and $15,356 respectively. Bids Feb. 25. Noted Feb. 26, C.D.

N. Y., New York—James Stewart & Co., Inc., general contractors, 230 Park Ave., New York, 12,300 tons structural steel for West Side Elevated Highway, from 46th to 59th Sts., for S. Levy, pres. Manhattan Boro, Municipal Bldg., to Harris Structural Steel Co., 419 4th Ave. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

Oklahoma—State Hy. Dpt., Oklahoma City, grveling 12.3 mi. Stephens Co., $26,570; 17.3 mi. Payne Co., $21,403; 18 mi. Kiowa Co., $22,000; 13.5 mi. Greer Co., $26,000; oil mat on 32.6 mi. in Osage Co., $78,240; 11.8 mi. Hughes Co., $38,710, own forces. Grand total $212,923. V. T. Moon, state hy. engr.

Oregon—State Hy. Comn., Salem, resurfacing Cold Springs-Bridge-Holdman Section of Pendleton Cold Springs Hy. in Umatilla Co., to H. C. Rogers, Yakima, Wash., $51,872.

Texas—G. Gilchrist, state hy. engr., Austin, caliche base course surfacing 5.306 mi. State Hy. "F," WPSO 737-B, Jim Hogg Co., to R. W. Briggs & Co., Pharr, $23,541 est. $25,000; grading, drainage structures, caliche base with asphalt base preservative surfacing 0.858 mi. State Hy. "F," WPSO 876-A, Lamb Co., to J. E. Barnhill, Plainview, $10,141 est. $10,000. New P.W.A. Bids Feb. 11. Noted Feb. 18, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, double asphalt on caliche surface treating 7.055 mi. State Hy. "F," NRS 738-A, Brown Co., to R. W. McKinney, Nacogdoches, $58,710. Est. $60,000. Bids Feb. 25. Old P.W.A. Noted Mar. 2, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, concrete paving 6.288 mi. State Hy. 6, F.A.P. 550, Falls Co., to Central Bitulithic Co., P. O. Box 5343, Dallas, $136,154. Noted Mar. 3, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, widening, grading, drainage structures, 12.014 mi. State Hy. 15, WPMH 526-C and D, Dallas Co., to Ben Sira & Co., 3101-5 Elm St., Dallas, $249,952. Est. $250,000. New P.W.A. Bids Feb. 12. Noted Feb. 10, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, construction of base preservation and seal coat 13.722 mi. State Hy. 66, Job 253-3-10, Control 253, Sect. 3, Comal Co., to Public Constr. Co., Denton, $28,533 est. $30,000; reconditioning base, base preservative, and seal coat surfacing 3.598 mi. State Hy. 66, Job M-73-2-10, Control 73, Sect. 2, Bexar Co., to Colglazier & Hoff, 326 Seguin Rd., San Antonio, $10,844 est. $15,000. Bids Feb. 25. Noted Mar. 3, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, concrete paving 4.334 mi. State Hy. 176, S.P. Control 424-2-1, Gregg Co., to Gaylord Constr. Co., Houston, $126,623 est. $140,000***concrete paving 0.177 mi. State Hy. 219, S.P. Control 466-1-1, Walker Co., to R. B. Butler, Bryan, $11,583 est. $10,000. Bids Feb. 25. Noted Mar. 3, C.D.

Texas—G. Gilchrist, state hy. engr., Austin, grading, drainage structures 9.429 mi. State Hy. "F," Hidalgo Co., to Briggs-Darby Constr. Co., Pharr, $35,393 est. $40,000***grading, drainage structures 3.958 mi. State Hy. 3, Gonzales Co., to Howard Bros., Madisonville, $68,150 est. $70,000***7.633 mi. State Hy. 2, W.P.H. 140-C, Part 2, Williamson Co., to Allhands & Davis, Southwestern Life Bldg., Dallas, $131,399 est. $140,000***grading and caliche base course paving 10.36 mi. State Hy. "F," Midland Co., to R. W. McKinney, Nacogdoches, $48,608 est. $55,000***rock and gravel shoulders 2.903 mi. State Hy. 6, Dallas Co., to Lone Star Constr. Co., 423 Seguin Rd., San Antonio, $32,622 est. $40,000. Grand total $316,172. Bids Feb. 25. New P.W.A.. Noted Mar. 3, C.D.

Washington—L. V. Murrow, dir. Hys., Olympia, grading, crushed stone surfacing 6.0 mi. State Rd. 7, Lincoln Co., to N. A. Degerstram, 15 East 32nd Ave., Spokane, $62,472***concrete paving 6.131 mi. State Rd. 5, Pierce Co., to Abertson & Cornell Bros., Inc., 1131 A St., Tacoma, $185,793. Noted Feb. 18, C.D.—Feb. 20, E. N.-R.

★ **West Virginia**—State Road Comn., Charleston, improving 2.93 mi. Brooke Co., to W. A. Wilson & Son, St. Marys, $135,168***0.622 mi. Calhoun Co., to Parkersburg Constr. Co., Parkersburg, $61,825***road in Fayette Co., to Janutolo Co., Fayetteville, $86,442***3.026 mi. Greenbrier Co., to Gilbert Constr. Co., Beckley, $72,080***3.055 mi. Hardy Co., to Murphy Constr. Co., Morgantown, $31,095***1.352 mi. Marion Co., to Pinnell & Pfost, Ripley, $123,620***0.662 mi. Marion Co., to R. W. Fimplet, Fairmont, $124,186***1.962 mi. Mercer Co., to Staples Constr. Co., South Charleston, $76,257***1.24 mi. Mercer Co., to Harry Hatfield & Co., Barboursville, $112,815 ***12.211 mi. Roane Co., to Ravenswood Constr. Co., Ravenswood, $13,485***5.63 mi. Preston Co., to Murphy Constr. Co., Morgantown, $62,630***Keyser bridge approach, Mineral Co., to Cumberland Constr. Co., Cumberland, $45,101 ***2.434 mi. and 3.301 mi. Wetzel Co., to Weirton Constr. Co., Weirton, $95,023 and $84,756 respectively. Grand total $1,124,483. Bids Mar. 10. Rejected bids Mar. 10, improving 2.022 mi. Taylor Co.; 4.747 mi. Morgan Co.; 0.301 mi. Morgan Co. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Wisconsin—State Hy. Comn., Madison, graveling 15.285 mi. Rock Co., to J. W. Lathers, Beloit, $14,956***7.181 mi. Marinette Co., to C. Berg, Campbellsport, $18,866***grading, drainage, bridges, 3.751 mi. Langlade Co., to Koch Constr. Co., 5232 North Diversey Blvd., Milwaukee, $44,355. Grand total $78,177. Bids Feb. 4. Rejected bids Feb. 4, roads in Rock and Portage Counties. Noted Feb. 7, C.D.—Jan. 23, E.N.-R.

Wisconsin — State Hy. Comn., Madison, grading, draining, concrete surfacing 0.245 mi. Dane Co., to G. W. Icke, 255 Washington Bldg., Madison, $25,54***crushed stone surfacing 9.918 mi. Green Co., to P. W. Ryan Sons, 303 South 3rd St., Janesville, $7,379***grading, graveling 0.255 mi. Brown Co. and grading, draining, mine tailing 0.481 mi. Grant Co., to T. Froemming Sons, 3116 North Humboldt Ave., Milwaukee, $6,152 and $7,865 respectively ***4.216 mi. Fond du Lac Co., to J. A. Zielke, Oakfield, $35,410***1.221 mi. Shawano Co. and 1.077 mi. St. Croix Co., to J. F. Bloomer, 735 West 5th St., Appleton, $21,783 and $40,957 respectively***grading, roadside treating 1.055 mi. Manitowoc Co., to Streu Constr. Co., Two Rivers, $17,392***1.164 mi. Pierce Co, to E. E. Hedrick, Chilton, $22,511***2.72 mi. Clark Co., to Burch Constr. Co., 119 East Washington Ave., Madison, $51,428***1.965 mi. Eau Claire Co., to R. Millis, Black River Falls, $15,927*** ***1.193 mi. St. Croix Co., to C. H. Peterson & Co., 5749 Pillsbury Ave., Minneapolis, Minn., $13,690***2.198 mi. Rusk Co., to A. Schroeder, Jr., 1011 West Capitol Dr., Milwaukee, $28,984***0.189 mi. Washburn Co., to N. M. Isabella, 2245 Eton Ridge Rd., Madison, $10,871 ***6.978 mi. Grant and Lafayette Counties, to W. Lathers, Jr., 216 Virginia Terrace, Madison, $92,628***0.457 mi. Dane Co., to F. Kutzke, Brooklyn, $21,619***2.3 mi. Washington Co., to Federal Paving Corp., 3829 North Weil St., Milwaukee, $27,727. Grand total $447,863. Rejected bids Mar. 6, roads in Dane, Jefferson and Grant Counties. Bids Mar. 6. Noted Mar. 12, C. D.—Feb. 27, E. N.-R.

EARTHWORK, IRRIGATION, DRAINAGE AND WATERWAYS

PROPOSED WORK

★ †**Arizona**—U. S. Eng., 751 South Figueroa St., Los Angeles, Calif., plans constructing Sabino Dam, in Santa Catalina Mountains, near Tucson. $750,000. Authorized to proceed with engineering and design, W.P.A. project. Work to be under direction of Major T. Wyman, Jr., c/o owner.

†**Oregon**—Bureau Reclamation, Ontario, structures on north canal laterals of Owyhee Project, near Ontario and Nyssa, incl. backfill, puddling or tamping concrete in structure, placing reinforcement bars, laying concrete pile, installing gates and hoists, 700 sq.yd. dry rock paving, from H. L. Horn, Nyssa, $8,818.

†**Tex., Port Aransas**—U. S. Eng., Galveston, rejected bids Feb. 10, dredging 469,000 cu.yd. inner basin Port Aransas Harbor. Noted Mar. 3, C.D.—Jan. 30, E.N.-R.

P. E. I., Charlotteburg—Municipality making plans constructing fillings and bridges across Brighton and Rocky Point. $50,000.

BIDS ASKED

California—Apr. 2, by State Hy. Comn., State Bldg., Los Angeles, constructing storm protection drainage system, 5.9 mi. long, involving 149,000 cu.yd. ditch and channel and 5,200 cu.yd. structural excav., 7,310 cu.yd. light rip rap, 1,176 ft. 24 in. corrugated metal pipe between Bendel's Corner and Imperial Co. line, Riverside Co. C. H. Purcell, P. Wks. Bldg., Sacramento, engr.

Ia., Council Bluffs—Mar. 24 and 25, by City Council, constructing Indian Creek Projects, Sects. 1 and 5, to be 11,900 ft. long with 26,000 cu.yd. rein.-con. for flood water channel. P.W.A. project. Alvord, Burdick & Howson, 20 North Wacker Dr., Chicago, Ill., engrs.

†**Nev., Boulder City** — Apr. 6, by Bureau Reclamation, Denver, Colo., furnishing, delivering f.o.b. cars Boulder City, structural steel supports, gratings and hand railings for walkways, stairs, ladders, to be installed in Lower Arizona and Lower Nevada tunnels at Boulder Dam, Boulder Canyon Project, Arizona-California-Nevada, Spec. 676.

†**New Mexico**—Apr. 2, by Bureau Reclamation, El Paso, Tex., constructing Caballo Dam, Rio Grande Project, near Hatch, incl. 263,000 cu.yd. stripping, 499,000 cu.yd. unclassified open-cut excav., 1,035,000 cu.yd. excav. from borrow pits, 153,500 cu.yd. rock excav. from borrow pits, 7,000 cu.yd. shaft and tunnel excav., 1,130,000 cu.yd. earth fill in embankments.

CONTRACTS AWARDED

La., Shreveport—Bd. Comn. Caddo Levee Dist., constructing 3 row permeable timber training spur in Cairo Bend on right bank of Red River, to E. L. McCain, Shreveport, $18,-

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†Federal Government.

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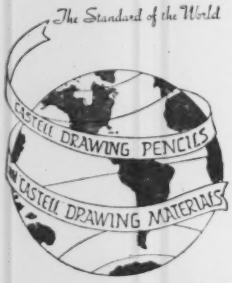

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Earthwork, etc. (Continued)

821; constructing tetrahedron retards in Cairo Bend, to W. C. Silley & L. A. Ellis, Monroe, $4,946. Bids Mar. 10. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

Mass., Boston—Commonwealth of Massachusetts, Dpt. P. Wks., W. F. Callahan, comr., 100 Nashua St., Boston, dredging in area between Cunard Docks and main ship channel, East Boston, to Bay State Dredging & Contg. Co., 62 Condor St., East Boston, $97,020; dredging approach to Commonwealth Pier 5, South Boston, to J. S. Packard Dredging Co., 1 Court St., $49,770. Bids Feb. 18, awarded Feb. 27. Noted Feb. 24, C. D.

†**Missouri**—U. S. Eng., St. Louis, placing earthwork, rebuilding levees Lost Creek Drainage Dist., Illinois River, to Edward E. Morgan Co., Inc., Jackson, Miss., $68,880. Bids Feb. 21.

★**Nebraska**—Central Nebraska Public Power & Irrigation Dist., Hastings, constructing 96.6 mi. irrigation canals and 86 timber bridges, to J. A. Tertling & Sons, Boise, Idaho; to Haas, Doughty & Jones, Merchants Exch. Bldg., San Francisco, Calif.; and to Morrison & Knudsen, Inc., Boise, Idaho, $622,530. P.W.A. Bids Dec. 14. Noted Dec. 24, C.D.—Dec. 5, E.N.-R.

†**Tex., Galveston**—U. S. Eng., Galveston, constructing groins along Galveston Texas seawall, to J. W. Zempter Constr. Co., 2115 Avenue F, $202,820. Bids Feb. 21. Noted Jan. 29, C.D.—Jan. 2, E.N.-R.

UNCLASSIFIED

PROPOSED WORK

†**Calif., Long Branch**—GAS PUMPING EQUIPMENT—Yards & Docks, Navy Dpt., Wash., D. C., rejected bids gas pumping equipment at 11th Naval Dist. (Naval Aviation Base Municipal Flying Field), Spec. 8086. Project cancelled.

Calif., Santa Monica—AIRPORT—City authorized by O. A. Stone, W.P.A. administrator for Los Angeles Co. to proceed with municipal airport enlargement, involving 4 in. pavement on two take-off strips, 3,000 ft. long and 200 ft. wide each, grading entire area and preparation of land clay pavement for remainder of the field, $292,000. H. B. Carter, City Hall, engr.

Ind., Newcastle—SWIMMING POOL—City, City Hall, plans swimming pool with water purification plant and athletic equipment in new athletic park, on 57 acre tract east part of city, $25,000 or more.

★**Ia., Des Moines**—RAILROAD TERMINAL—Greater Des Moines Committee appointed committee of 5 persons to confer with federal Rail Co-Ordinator J. B. Eastman, on plans for constructing joint railroad terminal here. Plans as outlined to committee before its decision by A. B. Hammond, consult. engr., Chicago, Ill., include passenger terminal station between East 2nd and 3rd Sts., south of Court Ave., tracks to station would be elevated according to plans, which would consolidate passenger facilities in existing Union and Rock Island passenger stations, $1,800,000.

Minn., Minneapolis—AIRPORT—City, c/o C. E. Doell, secy. Bd. Park Comrs., City Hall, constructing improvements to municipal airport, hard-surfacing 2 runways, each 2,600 ft. long, 150 ft. wide at Wold-Chamberlain Field, 63rd St. and 34th Ave., $250,000. Will hold election to vote $50,000 bonds if federal government grants $200,000.

O., Cleveland—MALL IMPROVEMENTS—City, S. Newman, park dir., bids in spring, improving mall property, incl. concrete sidewalks, paving, shrubbery, tree planting, seeding and lighting standards, $44,000. J. Fratoe, City Hall, engr.

Pa., Coudersport—GAS LINES—Public Service Comn. refused to grant franchise to Service Gas Co., Inc., Coudersport, and c/o G. L. Cabot, Inc., Olean, N. Y., to construct pipe lines and distribution system to supply natural gas to consumers in Tioga, Potter and McKean Counties, under original set-up. Noted Sept. 27, C. D.—Oct. 3, E. N.-R.

Pa., Oil City—PARK DEVELOPMENT—City, C. E. Hetrick, city clk., plans additional expenditure of $131,647 for completion of development of Hasson Heights Recreation Field, incl. final grading work, constructing steel bath houses with concrete floors, constructing filter house and installation of chlorinating equipment, concrete walks around swimming pool, driveway and parking lot, installing lighting system for field and floodlights for swimming pool, wire fence around pool, $18,645 to be expended for purchase of materials of above. It is expected this will be a W.P.A. project. B. B. Weber, city engr.

★**Texas, Louisiana, Arkansas and Utah.**—GAS and ELECTRIC SYSTEM IMPROVEMENTS—Electric Power & Light Co., 4 Rector St., New York, plans improvements to gas and electric systems. Est. of 1936 budget $14,500,000. Subsidiaries include United Gas Corp., 4 Rector St., New York.; Utah Power & Light Co., Salt Lake City, Utah; Arkansas Power & Light Co., 123 West 4th St., Little Rock Ark.; Louisiana Power & Light Co., 142 Delaronde St., New Orleans, La.; Dallas Power & Light Co., Dallas, Tex.; New Orleans Public Service, Inc., 312 Baronne St., New Orleans, La.

★**Ontario**—TRANSMISSION LINES—Ontario Hydro-Electric Comn., 620 University Ave., Toronto, constructing approximately 83 mi. transmission lines in various parts of province during 1936. Owner builds. Est. $5,000,000.

★**Ont., St. Thomas**—RAILROAD—Michigan Central Ry., W. J. Shaw, div. engr., replacement of 30 mi. line with 127 lb. steel between Windsor and Niagara frontier, $4,000,000.

BIDS ASKED

Ark., Knoxville Junction—RAILROAD—See "Contracts Awarded."

Calif., Los Angeles—SUBWAY—Apr. 8, by Bd. P. Wks., constructing Macy St. subway, rein.-con., 2 hinge, arch type, 68 ft. wide, 505 ft. long, 17 ft. clearance, Union Railway Terminal, $368,000. L. Aldrich, city engr. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

Calif., San Diego—BASEBALL PARK—See "Contracts Awarded."

Ill., Sterling—BROADCASTING STATION—Mar. 24, by Dpt. P. Wks. & Buildings, Div. Hys., Springfield, general contract plumbing, heating and air conditioning for radio broadcasting station. C. H. Hammond, supervising engr.

Maine—AIRPORT IMPROVEMENTS—See "Contracts Awarded."

†**Mass., Gloucester**—CAISSON FOUNDATIONS—Mar. 25, by Dpt. Commerce, Lighthouse Service, 37 Marginal St. Chelsea, Mass., constructing 7 steel sheet piling caisson foundations, interlocking type to replace wood pile dolphins, in Annisquam River, here.

New Hampshire—AIRPORT IMPROVEMENTS—See "Contracts Awarded."

N. H., Claremont—AIRPORT—See "Contracts Awarded."

N. J., Newark—SUBWAY—Apr. 9, by City, Dpt. P. Affairs, constructing new city railway partly underground and partly open cut subway from Belleville-Newark town line to new Penn. Ry. Station, bids asked for station finish and escalators for Sect. 1, City Railway-Pennsylvania Station loop, $125,000. R. Smille, City Hall, engr. Noted Apr. 19, C. D.—Apr. 25, E. N.-R.

New York—RURAL DISTRIBUTION LINES—See "Contracts Awarded."

N. Y., Elbridge—FISH HATCHERY, etc.—See "Contracts Awarded."

N. Y., Elmsford—PARK—See "Contracts Awarded."

N. Y., Flushing—STEEL SUPPORTS—Mar. 31, by Bd. Transportation, J. H. Delaney, chm., 250 Hudson St., New York, constructing steel supports for storage track, Steinway Tunnel Line (Flushing Branch), P.W.A. project.

N. Y., New York—BLEACHERS—See "Contracts Awarded."

N. Y., New York—SUBWAY—Apr. 14, by Bd. Transportation, J. H. Delaney, chm., 250 Hudson St., constructing 2nd section Sixth Avenue Subway from 33rd to 40th St.

†**O., Dover**—RELOCATION of TRACKS—Apr. 4, by U. S. Eng., 1st Natl. Bank Bldg., track laying and ballasting, and other miscellaneous work for relocation of Pennsylvania R.R., at Dover Reservoir.

Pa., Wernersville—TUNNEL—See "Contracts Awarded."

S. C., Clinton—RECREATIONAL BUILDING—Mar. 24, by B. O. Whitton, supt. Institutions, constructing recreational building, help's cottage, moving present administration building, heading administration building, equipment, paving, roofing buildings at Clinton, $25,000, P.W.A. project. This is part of $800,000 building program at State Institutions. Lafaye & Lafaye, 1226 Sumter St., Columbia, archts.

†**Tenn., Knoxville**—TRANSMISSION TOWERS—Apr. 2, by Tennessee Valley Authority, Knoxville, designing, furnishing, fabricating, galvanizing, delivering single circuit steel transmission towers for 67 mi. transmission line between Wheeler Dam, Ala. and Guntersville Dam, Ala., C. H. Garity, Knoxville, dir. Purchases.

Vermont—AIRPORT IMPROVEMENTS—See "Contracts Awarded."

†**Virgin Islands, St. Thomas**—GENERATOR SETS, etc.—Apr. 15, by Yards & Docks, Navy Dpt., Wash., D. C., two 75 kw. diesel engine generator sets and equipment in connection with aviation facilities, Spec. 8168.

CONTRACTS AWARDED

Ark., Knoxville Junction—RAILROAD—Missouri Pacific R.R., S. L. Wonson, asst. chf. engr., Missouri Pacific Bldg., 13th and Olive Sts., St. Louis, Mo., rebuilding 3.71 mi. railroad tracks between here and Spadra Junction, own forces. Est. about $260,000.

†**Calif., Benicia**—WHARF REPAIRS—Commanding Officer, Benicia Arsenal, repairing wharf at Benicia Arsenal, to Duncanson-Harrelson Co., DeYoung Bldg., San Francisco, $1,905. Bids Feb. 21, awarded Mar. 2. Noted Mar. 2, C. D.

Calif., Los Angeles—TRANSIT SHED RECONSTRUCTION, etc.—A. Eldridge, genl. mgr., City Hall, Harbor Dpt., reconstructing, relocating transit shed, Berth 155, incl. relocation of sprinkler tank and buildings, constructing concrete retaining walls, make and settle earthfill to new floor level, etc., Spec. 948, to Kress House Moving Co., 807 California St., $40,345; constructing creosoted timber wharf and fender system, 511 ft. long, 39 ft. wide, etc., Spec. 954, to Merritt-Chapman & Scott, San Pedro,

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†Federal Government.

Unclassified (Continued)

$153,584. **P.W.A.** Bids Feb. 19, awarded Mar. 4. Noted Feb. 26, C. D.—Feb. 6, E. N.-R.

†**Calif., Point Montara**—COAL PLANT—P. Wks. Officer, Navy Yard, Mare Island, remodeling coal plant for auxiliary power plant, installing gasoline tank, piping, electrical work, underground cables, provision for hot water circulating pump in dormitory at U. S. Naval Direction Finder, Station, to Underground Constr. Co., Route 1, Box 756, Berkeley, $1,468. Noted Jan. 17, C. D.—Jan. 23, E. N.-R.

Calif., San Diego—BASEBALL PARK—Harbor Dpt., constructing baseball park, 5,000 seating capacity grandstand, 5,000 seating capacity bleachers, lighted for night games, dugouts, etc., on 475x600ft. site, Broadway and Pacific Blvd., force account, $100,000. Hollywood Baseball Club (Pacific Coast League), lessee. J. Brennan, Municipal Pier, engr.

Calif., Stockton—FREIGHT, BARGE, etc.—City Port Comm., freight and barge transportation dock and transit shed extension, incl. water and drainage systems, etc., to O. H. Chain, 41 South Sutter St., $50,896. Bids Mar. 2, awarded Mar. 6. Noted Feb. 26, C. D.

Maine—AIRPORT IMPROVEMENTS—U. S. of A. Dpt. of Commerce, Airways Division, H. F. Law, 424 Park Sq. Bldg., Boston, Mass., and respective towns, have started work for enlarging 1 gravel runway and constructing new one at airport Auburn and Lewiston, $37,500; constructing gravel runway, Jackman, $13,275***; enlarging tar surfaced runways, Caribou, $38,300. Labor by Towns under W.P.A. Grand total $89,075. Materials being purchased by U. S. of A. Treas. Dpt., Procurement Division, K. P. Foster, Procurement Officer, 448 Park Sq. Bldg., Boston, Mass.

†**Mass., Squantum**—CONDUITS, etc.—P. Wks. Bldg., Navy Yard, Boston, Mass., constructing underground conduits, manholes, erecting pole line and furnishing, installing wires and cables at Naval Reserve Aviation Base, Spec. 8081, to Kenworth & Taylor, 11-17 Spalding St., Everett, Mass., $8,435. Noted Mar. 2, C. D.—Mar. 5, E. N.-R.

Michigan and Indiana — PIPE LINE — Panhandle Eastern Pipe Line Co., 101 West 11th St., Kansas City, Mo., twelve 1,300 hp. and two 1,000 hp. gas engine driven compressor units for pipe line from Detroit, Mich., to Texas Panhandle, to Cooper Bessemer Corp., Mt. Vernon, O. Est. exceeds $150,000. Noted Feb. 28, C. D.—Mar. 5, E. N.-R.

Neb., West Point—LIGHTING SYSTEM—See "Waterworks."

New Hampshire—AIRPORT IMPROVEMENTS—U. S. of A. Dpt. of Commerce, Airways Division, H. F. Law, 424 Park Sq. Bldg., Boston, Mass., and towns as noted constructing airport improvements, enlarging present tar surface runway and installing lighting equipment, Concord, $48,800; enlarging field, clearing, grading, etc., Nashua, $28,500; enlarging field, tar surface runways and lighting equipment, Manchester, $51,200. Labor by Towns, under W.P.A. Grand total $128,500. Materials being purchased by U. S. of A. Treas. Dpt., Procurement Division, K. P. Foster, Procurement Officer, 448 Park Sq. Bldg., Boston, Mass.

N. H., Claremont—AIRPORT—Town, **J. L.** Ainsworth, chn. Bd. Selectmen extension to airport, incl. grading, fill, runways, etc., day labor by owner upon maturity under W.P.A. $45,500. U. S. of A. Treas. Dpt., K. P. Foster, Procurement Officer, 448 Park Sq. Bldg., Boston, Mass., will purchase materials. U. S. of A. Dpt. Commerce, Airways Division, H. F. Law, 424 Park Sq. Bldg., Boston, Mass., engrs.

New York — EQUIPMENT INSTALLATION — Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing, installing equipment for Line D from Roosevelt Ave. to 178th St., Queens Boro, to Arc Electrical Constr. Co., 739 2nd Ave., New York, $83,833. **P.W.A.** Bids Jan. 14. Noted Dec. 30, C. D.—Jan. 2, E. N.-R.

★**New York** — RURAL DISTRIBUTION LINES — Niagara-Hudson Power Corp., Electric Bldg., Buffalo, constructing 2,000 mi. rural distribution lines, various locations, separate contracts and day labor. Est. $2,500,000. Private plans.

New York—TUNNEL—Caldwell Wingate Co., general contractors, 101 Park Ave., New York, 250 tons structural steel for Midtown Hudson Tunnel Ventilation Building, for Port of New York Authority, 111 8th Ave., New York, to Lehigh Structural Steel Co., Allentown, Pa. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

N. Y., Buffalo—TRAIN SHED—Grain League Federation Mills, Chamber of Commerce Bldg., altering and improving train shed on Ganson St., to Hydro Constr. Co., Stock Exch. Bldg.*** structural steel, to Ernst Iron Wks., 74 Lathrop St.***painting, to J. B. Barnes, 63 Woeppel St. ***roofing, to Globe Plaster Co., 154 West Huron St.***reinforcing steel, to Reecon, Inc., 154 West Huron St.

N. Y., Elbridge—FISH HATCHERY, etc.—Bd. Supervs. Onondaga Co. constructing fish hatchery and nursery by relief labor, $100,000. **W.P.A.** project. **Maturity in spring.** Noted Sept. 25, C.D.—Oct. 3, E.N.-R.

N. Y., Elmsford—PARK—Greenburgh Town Council, Town Hall, Tarrytown, completing Memorial Park, incl. grading, planting, seeding, paths, own forces, $25,000 additional sum appropriated. Will purchase materials. Private plans.

N. Y., New York—BLEACHERS—Dpt. Parks, Arsenal Bldg., Central Park, New York, constructing 40x360 ft., rein.-con. bleachers, River Ave. and 161st St., by relief labor, $135,000. Owner is purchasing materials. A. Embury, 2nd, c/o owner, engr. and archt.

N. Y., Stapleton—PORT DEVELOPMENT—J. McKenzie, comr. Docks, Pier A, Battery Pl., New York, erecting customs barriers and appurtenances on Foreign Trade Zone, between Piers 11 and 17, Contr. 2118, to A. Swedberg & Son, 233 Pelton Ave., West New Brighton, $23,444***dredging in slips adjacent to Piers 12 and 13, Contr. 2116, to O'Brien Bros. Dredging Corp., 233 Bway., New York, $172,500. Bids Feb. 29. Noted Feb. 2, C. D.

Pa., Wernersville — TUNNEL — Wernersville State Hospital, constructing underground corridor at Wernersville State Hospital, relief labor. Est. $68,048. Dpt. Health Harrisburg, engr.

Utah, Bingham — TUNNELS — Utah Copper Co., Kearns Bldg., Salt Lake City, constructing 2 tunnels, one 1,575 ft. and other 445 ft. long, through Freeman Peak for Bingham & Garfield R.R., to Utah Constr. Co., Ogden, $183,000. **H. C. Goodrich**, Kearns Bldg., Salt Lake City, **ch. engr.**

Vermont—AIRPORT IMPROVEMENTS—U. S. of A. Dpt. of Commerce, Airways Division, H. F. Law, 424 Park Sq. Bldg., Boston, Mass., and towns as noted, airport improvements constructing tar runway and drainage system, at airport, Montpelier and Barre, $21,600***tar surface present runways, drainage, etc., Burlington, $17,900***constructing 1 story, steel frame hangar building and enlarging gravel runway, St. Johnsbury, $24,400. Town labor under W.P.A. Grand total $63,900. Materials being furnished by U. S. of A. Treas. Dpt., Procurement Division, K. P. Foster, Procurement Officer, 448 Park Sq. Bldg., Boston, Mass.

†**Wis., Trempealeau and Winona**—U. S. Engr., St. Paul, Minn., channel markers in Pool 5A-6, Mississippi River, to W. W. Magee Co., 118 Central Ave., St. Paul, Minn., $34,360. Bids Jan. 28.

MATERIALS AND EQUIPMENT

PROPOSED WORK

PIG LEAD—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt., Dpt. Water & Power, 207 South Bway., rejected bids Jan. 14, furnishing pig lead as required during period of 1 year, from date of contract, Spec. X-7. To exceed $2,000. Noted Jan. 9, C. D.

CABLE—**Oakland, Calif.**—City, W. W. Chappell, city clk., plans purchasing 13,373 ft. No. 16 and 1,500 ft. No. 10, AWG saturated paper insulated lead covered cable.

MINE PUMPING EQUIPMENT — **Cripple Creek, Colo.**—Cresson Consolidated Gold Mining & Milling Co., Cripple Creek, A. H. Bebee, supt., plans purchasing equipment to pump water from lower levels of Cresson mine, probably electric pumps. Will have to pump about 2,000 ft. to surface and throw about 5,000 gals. water a minute.

TRUCK, etc.—**Easthampton, Mass.**—Town, F. Smith, chn. Bd. Selectmen, plans purchasing one 1½ ton truck, $1,200; one 5 ton tractor, $3,300; road oil $5,000.

TRUCK—**Hingham, Mass.**—Town, W. L. Howard, clk., soon takes bids for truck for Hy. Dpt., $3,500; 2 radio equipped automobiles for Police Dpt., $1,575; 2-way radio system for Police Dpt., $700; 1 bucket loader for snow removal $3,500; one inhalator for Police Dpt., $375. Appropriation granted.

FIRE TRUCK, etc.—**Hopedale, Mass.**—Town, C. F. Austin, chn. Bd. Selectmen, Town Hall, soon takes bids furnishing fire truck, $6,250; fire hose, $600. Appropriation made.

FIRE TRUCK—**Hudson, Mass.**—Town, J. F. Meserve, chn. Bd. Selectmen, Town Hall, plans purchasing at once 750 gal. pumping capacity fire truck, $9,000.

WATER PUMP, etc.—**Lunenburg, Mass.**—Town, R. L. Fiske, chn. Bd. Selectmen, Town Hall, plans purchasing electric water pump and pipe, $500; snow removal equipment, $1,000; booster pump tank hose, $525; 500 ft. 2½ in. fire hose, $550; 200 ft. 1½ in. fire hose, $60; 1,000 ft. 1½ in. forest fire hose, $280.

PUMPING ENGINE—**Newton, Mass.**—City, C. Randlett, fire chief, City Hall, appropriation made and plans purchasing one pumping engine for Fire Dpt., $8,000.

HOSE, etc. — **Webster, Mass.** — Town, J. A. Patenaude chn. Bd. Selectmen, plans purchasing hose for Fire Dpt. and Forest Fire Dpt. $3,000; also fire alarm cable.

SNOW PLOW, etc.—**Claremont, N. H.**—Town, J. L. Ainsworth, chn. Bd. Selectmen, Town Hall, plans purchasing sidewalk snow plow, $1,500; one 1½ ton truck, $1,500.

TANKS—**Buffalo, N. Y.**—Hambleton Terminals Corp., 46 Skillen St., soon purchases 1,000 gal. steel gasoline storage tank for gasoline service station, to be built at Main and Balcom Sts., Nussbaumer & Clarke, Inc., 327 Franklin St., engrs.

PIPE, etc.—**Forestville, N. Y.**—M. Luder & Son, Forestville, plans purchasing about 2,000 ft. 6¼ or 6⅝ in. pipe and connections, $1,400.

FIRE FIGHTING UNIT—**Poland, N. Y.**—Village Bd. Trustees, election Mar. 17, to vote on purchasing fire fighting unit, $2,000.

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†*Federal Government.*

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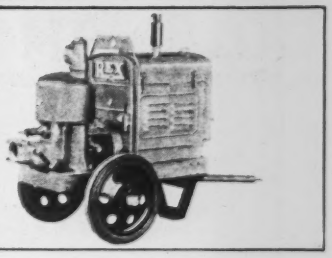

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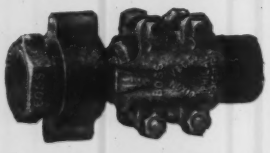

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Materials, etc. (Continued)

STEEL STORAGE TANK—Rochester, N. Y.—Standard Oil Co. of New York, Genesee Bldg., Buffalo, plans purchasing 1,000 gal. gasoline storage tank at 657 Brooks St. To exceed $1,000.

STEEL TANK—Rochester, N. Y.—Standard Oil Co. of New York, Genesee Bldg., Buffalo, will purchase, 1,000 gal. steel tank for gasoline storage at service station 710 South Avenue. To exceed $1,000.

STEEL TANK—Rochester, N. Y.—Tidewater Oil Co., 11 North Pearl St., plans purchasing 1,000 gal. steel tank for gasoline storage for service station, Genesee and Hawley Sts. To exceed $1,000. E. C. Smith, Elmsmere, engr.

TANKS—Rochester, N. Y.—Goodyear Wende Oil Co., 26 Lansing St., Buffalo, plans purchasing 500 and 1,000 gal. gasoline storage tanks at gasoline storage stations. To exceed $1,000.

TANK—Rochester, N. Y.—Standard Oil Co. of New York, Genesee Bldg., Buffalo, will purchase 500 gal. or 1,000 gal. steel gasoline storage tank for gasoline service station to be constructed at 12 Buffalo Rd. To exceed $1,000.

STEEL STORAGE TANK—Syracuse, N. Y.—W. Gerber, Herald Bldg., will purchase steel gasoline storage tank for service station to be constructed at East Fayette and Ellis Sts. To exceed $1,000. W. Markam, Everson Bldg., engr.

SEWER PIPE—Utica, N. Y.—Bd. Contr. & Supply, City Hall. J. B. Shaw, engr., soon takes sewer pipe for sewer from upper section of 17th Ward at New Hartford Disposal plant to city outlet via Nail Creek. To exceed $1,000. J. B. Shaw, City Hall, engr.

MANHOLE RINGS, etc.—Cleveland, O.—City legislation under way to authorize purchase of 1,200 manhole rings and covers.

OUTDOOR ELECTRIC METER RECEPTACLES and ACCESSORIES—Cleveland, O.—City, F. Milton, purch. agt., legislation under way to authorize purchase of 1,000 outdoor electric meter receptacles and accessories.

FIRE TRUCK—Altoona, Pa.—City, H. J. Baum, engr., City Hall, plans purchasing new fire pumper truck with boaster tank, etc., $5,000 or more. **Maturity soon.** T. W. Alleman, ch. of Fire Dpt.

ALUMINUM MELTING FURNACE—Conshohocken, Pa.—Conshohocken Pattern Wks., in market for master aluminum melting furnace.

FLOODLIGHTING EQUIPMENT—Smethport, Pa.—Boro. Boro Hall, plans purchasing floodlighting equipment for installation in McCoy Stadium. **Maturity soon.** Est., $7,000 to be raised by popular subscription. Boro Eng. Dpt., Boro Hall, engrs.

ROAD ROLLER—Williamsport, Pa.—City, G. W. German, dir. Dpt. Streets, B. C. Houck, city clk., takes bids before Apr. 1, one 10 ton road roller with scarifier attached. To exceed $1,000. L. Mussina, city engr. G. W. German, dir. Dpt. Streets.

FIRE TRUCK—Aberdeen, S. D.—City plans purchasing fire truck for use in neighboring areas, where city water service does not reach, also installing automatic alarm system. J. Lemar, asst. ch. City Fire Dpt.

TRUCKS—Norfolk, Va.—City, interested in prices 2 trucks for sewer work at General Booth Prison Farm. To exceed $700 each.

PIPE, etc.—Auburn, Wash.—City soon takes bids furnishing 900 ft. 8 in. c.i. pipe, c.i. tees, gate valves, 1,330 lb. virgin lead, 45 lb. rope oakum, 108 ft. 4 in. extra strength rein.-con. pipe. J. A. Fallgreen, City Hall, engr.

FIRE APPARATUS—St. Stephen, N. B.—Municipality, D. R. Wilson, mayor, interested in prices of fire apparatus, particularly up-to-date pumper.

SNOW REMOVAL EQUIPMENT, etc.—Halifax, N. S.—Municipality bids in spring for snow removal equipment and mechanizing garbage department, $25,000; also purchasing 2 additional units in the incinerator, $20,000.

BIDS ASKED

PIPE, etc.—Coalinga, Calif.—E. McCroskey, city clk., taking bids furnishing 3,500 ft. plain and beveled range 2, 3½ in. O.D. mill random lengths gas pipe; 3,800 ft. 1½ in. standard galvanized line pipe; 3,500 ft. 4 in. 16 ft. c.i. line pipe.

OIL CIRCUIT BREAKERS—Los Angeles, Calif.—Mar. 30, by D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing two 34½ kv., 1,200 amp, 60 cycle, 3 pole single throw truck mounted oil circuit breakers, Spec. 1893. To exceed $2,000.

†**HOPPER DREDGE—San Francisco, Calif.**—Apr. 10, by U. S. Eng., Custom House, San Francisco, constructing and delivering afloat 1 steel twin screw, twin-rudder hopper dredge with direct Diesel propulsion engine, hydraulic couplings and reduction gears, 400 hp. each shaft, with 300-500 cu.yd. hopper capacity; 340 hp. motor driven pump, power supplied by 275 kwa. Diesel driven d.c. generator, auxiliaries, power for same being furnished by two 75 kw. d.c. Diesel driven generating sets, here.

LUMBER — San Francisco, Calif. — T. A. Brooks, city purch. agt., City Hall, taking bids furnishing fir, redwood and spruce for various Municipal Departments for period Apr. 1, 1936, to July 31, 1936. Bid 1531.

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RAILWAY TRACK MATERIAL—San Francisco, Calif.—Mar. 30, by T. A. Brooks, city purch. agt., City Hall, furnishing railway track material for municipal railway. Bid 1522. To exceed $1,000.

REDWOOD TIES—San Francisco, Calif.—Mar. 27, by T. A. Brooks, city purch. agt., City Hall, furnishing 4,270 split or hewn redwood ties, 6x8 in., x 8 ft., Bid 1521.

STEEL PIPE—San Francisco, Calif.—Mar. 27, by T. A. Brooks, city purch. agt., City Hall, furnishing 50,000 ft. ¾ in., 5,000 ft. 1 in., 2,000 ft. 2 in., 100 ft. 6 in. galvanized wrought steel pipe, Bid 1520.

SYNCHRONOUS MOTORS—Los Angeles, Calif.—Apr. 23, by Directors Metropolitan Water Dist., F. E. Weymouth, engr., 306 West 3rd St., furnishing synchronous motors for intake and gene plants, 6 motors, 6,700 kw. output 9,000 hp. each; Iron Mountain Plant, 3 motors, 3,200 kw. output 4,300 hp. each; Eagle Mt. and Hayfield Plants, 6 motors, 9,300 kw. output, 12,500 hp., Spec. 153 Colorado River Aqueduct Project. To exceed $1,000.

†**PIPE FITTINGS, etc.—Wash., D. C.**—Mar. 30, at office General Purchasing Officer, Panama Canal, Wash., D. C., cast iron pipe fittings, pine and douglas fir lumber, car stake lumber, and calcium chloride, Schedule 3131.

PORTLAND CEMENT—Chicago, Ill.—Mar. 26, by City, City Hall, furnishing, delivering Portland cement by rail or truck during period ending Dec. 31, 1936. $25,000. O. E. Hewitt, city engr.

BRIDGE LUMBER, etc.—Creston, Ia.—Mar. 25, by Union Co., 104,700 ft. BM Douglas fir bridge lumber; 34,884 ft. BM creosoted southern yellow pine lumber; 3,830 lin.ft. creosoted southern yellow pine piling; 940 lin.ft. corrugated metal pipe. F. W. Sarvis, co. engr.

TREATED PILING—Garner, Ia.—Mar. 31, by Hancock Co., F. C. Missal, co. aud., 1 carload treated piling, 1 carload treated and 1 carload untreated lumber; and 1 carload of lubricating oil. C. F. Merten, co. engr.

†**ROCK DRILLS—Eastport, Me.**—Mar. 23, by U. S. Eng., 6 rock drills.

†**ELECTRIC WIRING, etc.—Ayer, Mass.**—Mar. 25, by Con. Q.M., Fort Devens, rehabilitating electric wiring and electrical equipment in old camps, Circular 107.

†**BRASS COCKS, etc.—Boston, Mass.**—Mar. 24, by Bureau Supplies & Accounts, Navy Dpt., Wash., D. C., brass cocks, steel flanges and 1 wood turning lathe; also timber, lumber and doors, for Boston Navy Yard. To exceed $1,000.

ROAD ROLLER—Marblehead, Mass.—Mar. 25, by Town, Surveyor of Hys., Hy. Office, Vine St., 14 ton road roller.

†**STEEL PLATES—Vicksburg, Miss.**—Apr. 9, by U. S. Eng., 36,210 lb. structural steel plates, sheared, f.o.b. Greenville.

†**WIRE ROPE—Vicksburg, Miss.**—Apr. 9, by U. S. Eng., 4,000 lin.ft. 6x25 flattened strand high grade plow steelwire rope, f.o.b. Lake Providence, La.

PIPE—Woodville, Miss.—Apr. 7, by Mayor and Bd. Aldermen 1,200 ft. 1¼ in. galvanized pipe with extra heavy coupling, 8 1¼x1¼xl galvanized tees. Mary B. Scott, city clk.

†**GALVANIZED ANNEALED STRAND—Kansas City, Mo.**—Mar. 25, by U. S. Eng., 232 Mfg. Exch. Bldg., furnishing 210,000 ft. ¼ in. galvanized annealed strand, f.o.b. contractor's plant. $3,000.

†**GALVANIZED ANNEALED STRAND—Kansas City, Mo.**—Mar. 26, by U. S. Eng., 232 Mfg. Exch. Bldg., furnishing, f.o.b. contractor's plant 210,000 ft. ¼ in. galvanized annealed strand. $3,000.

†**CONCRETE CURING SOLUTION—Fort Peck, Mont.**—Apr. 1, by U. S. Eng., Fort Peck, 25,000 gal. bituminous concrete curing solution for surface treatment method of curing concrete for Fort Peck Dam. $2,500.

†**MATTRESS LUMBER, etc.—Omaha, Neb.**—Mar. 20, by U. S. Eng., 819 City Natl. Bank Bldg., 1,000,000 bd. ft. 1x4 mattress lumber, $25,000; and 120,000 lb. 30% dynamite, $1,500.

STONE, etc.—New Jersey—Mar. 23 by F. A. Brodesser, state purch. agt., Trenton, 3,828 tons broken stone, 1,552 tons cement sand, 3,918 bags white cement, 71,341 bags cement, 3,906 tons crushed stone, 4,825 tons each ¾ in. and 1½ in. stone, 4,770 tons cement sand.

†**GASOLINE POWER SHOVEL—Hilton, N. Y.**—H. Peters taking bids gasoline power shovel. To exceed $1,000.

COMPRESSORS, etc.—New York, N. Y.—Mar. 24, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., furnishing, delivering compressors and pumps for Independent City-owned Rapid Transit Railroad System.

OAK TIMBER—New York, N. Y.—Overseas Lumber Co., Inc., 52 Vanderbilt Ave., in market for about 6,000,000 ft. white oak timber, suitable for stave making.

SHOP MACHINERY, etc.—New York, N. Y.—Apr. 3, by Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., furnishing, delivering installing additional shop machinery at 207th Street Shops Contr. Y-11.

†*Federal Government.*

Materials, etc. (Continued)

GENERATOR, etc.—**Cleveland, O.**—F. Milton, city purch. agt., bids about Mar. 17, battery charging motor generator, truck winch and power takeoff, pipe threading machine, subway type cable switch boxes, pole type oil switches, gong operated disconnecting switches, etc.

CEMENT — **Ashley, Pa.** — Apr. 6, by Boro Council, S. E. Christman, secy., furnishing approximately 15,000 gal. Type C-2 asphalt cement cutback with petroleum naphtha. To exceed $1,000. G. W. Picton, 49 Division St., Wilkes-Barre, boro engr.

CEMENT, etc.—**Old Forge, Pa.**—Apr. 6, by Borough Council, Borough Hall, 961 bags portland cement, 12 bbl. lime, 150 lb. gaging plaster, 4 tons gravel, 56 gal. paint, 18 gal. varnish, 10 gal. turpentine, 41 lin.ft. copper gutter, two 24 in. steel beams, 40 ft. long, 8 steel window frames, rough and dressed lumber, face brick, 25 boxes dynamite, 50 boxes exploders, 17 manhole covers and frames, 21 catch basin covers and frames, 1,665 ft. 24x18 in. sewer pipe, 2,750 ft. 8 in. sewer pipe, 420 ft. 10 in. sewer pipe, nails, etc. To exceed $1,000.

GENERATOR SETS — **Renfrew, Pa.** — Price Bros., Renfrew, taking bids furnishing several gas and oil engine generator sets. $1,000 or more.

SURFACE TREATMENT—**Richmond, Va.**—Mar. 24, by State Hy. Dpt., Richmond, furnishing 1,960,000 gal. hot surface treatment, 7,134,000 gal. light cold surface treatment and light cold patch; 12,503,720 gal., heavy cold surface treatment and heavy cold patch; furnishing, applying 1,931,720 gal. heavy cold surface treatment and cold patch; applying 13,254,000 gal. surface treatment materials, hot and cold, and filling drums on road for patch material.

AIR COMPRESSOR, etc.—**Edgerton, Wis.**—Mar. 24, by City, air compressor, diesel engine, centrifugal pump. L. H. Kessler, Madison, engr.

THAWING MACHINE—**Calgary, Alta.**—T. B. Riley, city comr., Town Hall, in market for self-contained electrical thawing machine.

ASPHALT—**Saint John, N. B.**—Mar. 30, by H. D. Hopkins, clk., City Hall, supplying 300 tons of asphalt.

HIGHWAY EQUIPMENT—**St. John, N. B.**—W. A. Ross, county clk., in market for highway equipment for Parish of Simonds. $18,000 voted.

CRUSHER—**Aldershot, Ont.**—Howard Sand & Gravel Co. Ltd., in market for medium-sized pulverizing roll crusher.

RECRUSHING OUTFIT, etc.—**Peterborough, Ont.**—R. H. Parsons, city engr., in market for recrushing outfit. $3,500 voted; and team grader, $200 voted.

METERS—**Port Arthur, Ont.**—R. B. Chandler, purchasing agt. Utilities Comn., in market for twenty-four 10 amp. 15 volt meters, thirty-two amp. 250 volt meters, for Municipality.

CONTRACTS AWARDED

CAST IRON PIPE and FITTINGS—**Fresno, Calif.**—H. S. Foster, city clk., furnishing 1,800 ft. 6 in., 1,350 ft. 8 in., 4,250 ft. 12 in. and 3,300 ft. 10 in. Class 150, c.i. pipe, to U. S. Pipe & Fdry. Co., Monadnock Bldg., San Francisco, $2,074. Bids Jan. 2.

STEEL POLES, etc.—**Long Beach, Calif.**—City Council, 136 steel poles, incl. wiring outlets and pole tops, Spec. R-874 for poles and accessories, to Electric Railway Equipment Co., 2900 Gormany St., Cincinnati, O., $15,504***Spec. R-875, fluted poles and accessories, to L. B. Marsh Electric Co. 1290 Gaviotta St., $942. Bids Jan. 29.

BATCH CAR BODIES—**Los Angeles, Calif.**—Metropolitan Water Dist., 306 West 3rd St., 40 steel batch car bodies f.o.b. Los Angeles, for use in concrete work, Spec. 147, to Buehler Tank & Welding Wks., 5000 Pacific Blvd., $10,535. Bids Feb. 28, awarded Mar. 6. Noted Mar. 6, C.D.—Feb. 20, E.N.-R.

CABLE—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., 8,900 ft. lead covered cable, Spec. 1882, to General Cable Co., 3600 Mines Ave., $3,185. Bids Feb. 24. Noted Mar. 3, C. D.

FIRE BRICK—**Los Angeles, Calif.**—A. J. Holm, city purch. agt., City Hall, fire brick for municipal incinerator, Spec. 3469, incl. 46,086 nine in. straight and skew, 16,680 nine in. circle, 84 in., 1,770 nine in. rotary kiln block, 60 in., 7,440 nine in. rotary kiln block, 78 in., 3,200 special suspended blocks, 630 special skew back blocks, 28,000 special dome brick, 700 special charging hole blocks for city, Spec. 3469, to Gladding-McBean Co., 2901 Los Feliz Blvd., $13,357. Bids Feb. 14, awarded Mar. 4. Noted Feb. 11, C. D.

POLES—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing ninety 35 ft., three hundred 40 ft., one hundred and twenty 50 ft., fifty 55 ft., thirty-five 65 ft., six 90 ft. creosoted poles, Spec. 1886, to J. H. Baxter & Co., 601 West 5th St., $10,203. Bids Mar. 2, awarded Mar. 5. Noted Mar. 9, C. D.

†TAMPING ROLLERS — **Los Angeles, Calif.**—U. S. Eng., 751 South Figueroa St., furnishing 2 tamping rollers, Proposal 465, to Southwest Welding & Mfg. Co., 3201 West Mission St., Alhambra, $1,196. Bids Feb. 25, awarded Mar. 7.

VACUUM VALVES, etc.—**Los Angeles, Calif.**—D. P. Nicklin, purch. agt. Dpt. Water & Power, 207 South Bway., furnishing twenty-two 8 in. vacuum valves and six 1 in. air release valves, Spec. 1873, to Simplex Valve & Meter Co., 68th and Upland Sts., Phila., Pa., R. W. Lawton, 137 North Van Ness Ave., Los Angeles, local representative, $5,194. Bids Feb. 21. Noted Feb. 6, C. D.—Feb. 13, E. N.-R.

PORTLAND CEMENT, etc.—**Oakland, Calif.**—J. H. Kimball, secy., 2,400 bbl. Portland cement, Proposal 720, to Cowell Lime & Cement Co., 2 Market St., San Francisco, $2.59 per bbl. Bids Feb. 19, awarded Feb. 28. Noted Feb. 26, C. D. Rejected bids Feb. 19, furnishing 2,200 tons fine aggregate, Proposal 731. Will purchase in open market.

†PILES—**San Francisco, Calif.**—U. S. Eng., Custom House, furnishing, driving 70 rough untreated piles on shoal in San Francisco Bay, north of Yerba Buena Island, to B. C. Gerwick, 112 Market St., $2,060. Bids Mar. 2.

BLACK PIPE—**San Rafael, Calif.**—East Bay Municipality Dist., San Rafael, furnishing 5,000 ft. 2 in. black pipe, to Walworth California Co., 235 2nd St., San Francisco, $877. Awarded Mar. 2. Noted Feb. 19, C.D.

STEEL — **Chicago, Ill.** — City, City Hall, furnishing, delivering structural and cast steel for reconstructing floor of Grand Ave. Bridge, to Bethlehem Steel Co., 400 North Michigan Ave., $12,730. Bids Feb. 19, awarded Mar. 2. Noted Feb. 14, C. D.

BRIDGE LUMBER—**Montezuma, Ia.**—Poweshiek Co., 117,600 ft. BM Class D and 21,120 ft. BM Class A bridge lumber, 24,000 ft. BM treated yellow lumber, to Wheeler Bridge Lumber & Supply Co., 606 Hubbell Bldg., Des Moines, $7,858. Bids Mar. 3, awarded Mar. 3.

LUMBER — **New Hampton, Ia.** — Chickasaw Co., 65,000 lin.ft. Class D lumber; 41,000 ft. BM treated yellow pine lumber, and 2,000 ft. BM Class C lumber, to Wheeler Lumber, Bridge & Supply, 606 Hubbell Bldg., Des Moines, $6,139. Bids Mar. 3. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

LUMBER—**Tipton, Ia.**—Cedar Co., 174,960 ft. BM Class D bridge lumber to Central State Bridge Supply Co., Fort Madison, $7,121. Bids Mar. 3. Noted Feb. 25, C. D.

†PILE DRIVER, etc.—**Eastport, Me.**—U. S. Eng., Eastport, 1 floating pile driver, Spec. 284-36-387 to J. R. Peterson, 131 State St., Boston, Mass., $7,540***1 set derrick fittings, Spec. 284-36-406, to Parker Danner Co., 195 Federal St., Portland, $309. Bids Feb. 11 and 24. Noted Feb. 7.

LEAD PIPE, etc.—**Boston, Mass.**—D. F. Doherty, supt. Supply Dpt., City Hall Annex, lead pipe for Water Division and white and red lead for various departments, to National Boston Lead Co., 800 Albany St., $1,200 and $2,250 respectively***pig lead to various departments to R. E. Henchey, 11 Mystic St., Charleston, $7,202***crushed stone to following districts, South Boston and Dorchester, to W. J. Barry, 453 Cummings Hy., Roslindale, $19,600*** East Boston, to Rowe Contg. Co., 1231 Centre St., Jamaica Plain, $4,984***Charleston, to Concrete Materials Co., 509 Main St., Saugus, $4,806***Brighton, West Roxbury, and Roxbury to West Roxbury Trap Rock Co., 10 Grove St., West Roxbury, $24,764***Hyde Park, City Proper 8 and 10, to Metropolitan Crushed Stone Co., 89 Broad St., $13,300. Grand total $78,106. Bids Jan. 28, 29 and 30, awarded Feb. 24. Noted Jan. 24, C.D.

CLOSING BAG MACHINE, etc.—**Gulfport, Miss.**—City, furnishing, installing closing bag machine and horizontal conveyor combined in warehouse, on West Pier in Gulfport Harbor, to Union Special Machine Co., 400 North Franklin St., Chicago, Ill., $1,574.

AUTOMOBILE CASINGS, etc. — **Hastings, Neb.**—Central Nebraska Public Power & Irrigation Dist., Hastings, to Firestone Tire & Rubber Co., 20th and Harney Sts., Omaha, 125 automobile casings and 150 automobile tubes 1st grade tires, 4 ply, $6.56 each; 6 ply for $7.80 each; 1st grade tubes, rubber valve stems, $1.06 each***to Standard Blue Print Co., 1411 Harney St., Omaha, 14 dummy levels with tripods and accessories, $2,075. **P.W.A.** Bids Feb. 5. Noted Feb. 3, C. D.

†CEMENT—**Elko, Nev.**—U. S. Indian Irrigation, Los Angeles, Calif., 5,100 bbl. cement for Wild Horse Dam, Duck Valley Project, Western Shoshone Indian Reservation, to Pacific Portland Cement Co., 111 Sutter St., San Francisco, Calif., $15,857. Bids Feb. 19.

COPPER WIRE—**Pioche, Nev.**—Pioche Power Dist., Pioche, furnishing copper wire for power line from Boulder Dam to Pioche, to Anaconda Copper Co. and General Cable Co., $235,000. Bids Feb. 5. **P.W.A.**

STORAGE TANK—**Jersey City, N. J.**—Public Service Co., 80 Market St., Newark, constructing oil storage tank, 82,000 bbl. capacity (containing over 300 tons steel), to Dover Boiler Wks., 50 Church St., New York.

PIPE DISTRIBUTORS—**Raleigh, N. C.**—Div. Purchase & Contr., A. S. Brower, dir., three 1,000 gal. units and two 800 gal. distributors mounted on semi-trailer, to Carolina Tractor & Equipment Co., 733 West Hargett Ave., at $3,326.55 and $3,237.60 each respectively. (**Correction**—Price.) Bids Feb. 14. Noted Feb. 20, C. D.—Feb. 27, E. N.-R.

TRUCKS, etc.—**Raleigh, N. C.**—Div. Purchase & Contr., A. S. Brower, dir., Raleigh, to Chevrolet Motor Co., 522 West 11th St., Charlotte, eighty-five 1½ ton trucks, chassis wheel base 131 in., $45,842***to Heil Co., 3000 West Montana St., Milwaukee, Wis., eighty 1½ cu.yd. dump bodies, $10,000***to Carolina Tractor &

†*Federal Government.*

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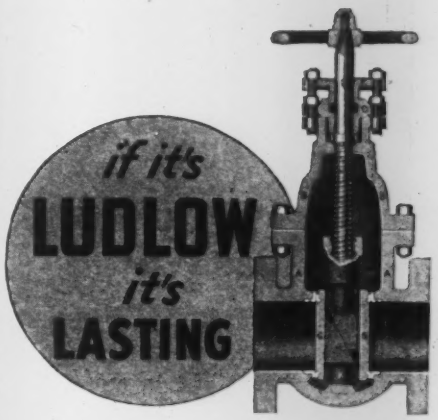

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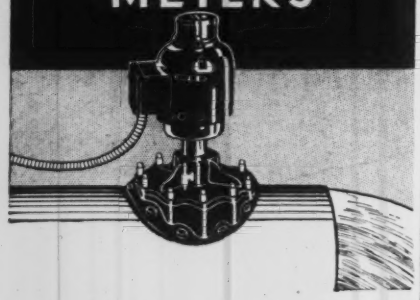

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Materials, etc. (Continued)

Equipment Co., 733 West Hargett St. ten 4 wheel drive trucks, $25,121; 2 belt conveyors, $1,864; 6 disc harrows, $1,080***to Corbitt Co., Henderson, ten 4 wheel drive trucks, $26,365*** to Raleigh Tractor & Equipment Co., 419 South Wilmington St., seven 5 ton three wheel gasoline road rollers, $15,817***to North Carolina Equipment Co., 3116 Hillsboro St., one 5 ton 3 wheel gasoline road roller, $1,670; two 2 in. centrifugal water pumps, $198***to E. F. Craven, Greensboro, 2 belt conveyors, $2,192*** to Chattanooga Boiler & Tank Co., Box 110, Charlotte, $1,830. Grand total $131,979. Div. Purchase & Contr., A. S. Brower, dir., furnishing storage batteries, to Douglass Battery Mfg. Co., Winston Salem and Southern Bearing & Parts Co., 315 North College St., Charlotte*** 400,000 bbl. cement, to Medusa Portland Cement Co., Midland Bldg., Cleveland, O., Volunteer Portland Cement Co., 502 South Gay St., Knoxville, Tenn., Lehigh Portland Cement Co., Sandt's Eddy, Allentown, Pa.; Penn-Dixie Cement Corp., James Bldg., Chattanooga, Tenn., National Cement Co., Martin Bldg., Birmingham, Ala.; Lone Star Cement Co., Virginia Inc., National Bank of Commerce Bldg., Norfolk, Va.; Universal Atlas Cement Co., 1616 Walnut St., Phila., Pa.; Signal Mountain Portland Cement Co., Volunteer Bldg., Chattanooga, Tenn., and Alpha Portland Cement Co., Easton, Pa. Bids Feb. 27. Noted Feb. 20 and 25. C. D. Rejected bids Feb. 27, 6,600,000 gals. (asphalt) bituminous materials.

VALVES and CASTINGS—**Cincinnati, O.**—City, valves and steel castings to Dpt. P. Wks., to E. H. Bardes Range & Fdry. Co., 305 Walnut St. $6,608. Awarded Feb. 26.

†SHEET PILING—**Knoxville, Tenn.**—Tennessee Valley Authority, Knoxville, 6,000 lb. sheet piling and connections, f.o.b. Sheffield, Ala., for Guntersville and Chickamauga Dams, to Bethlehem Steel Corp., Bethlehem, Pa., $180,000; 8,400,000 lb. sheet piling and connection, f.o.b. Chattanooga, to Inland Steel Corp., 38 South Dearborn St., Chicago, Ill., $243,000. Bids Jan. 31. Noted Jan. 23, C. D.

†SWITCHBOARDS — **Knoxville, Tenn.** — Tennessee Valley Authority, Knoxville, furnishing, assembling an d delivering auxiliary switchboards for Norris Power Plant, to I.T.E. Circuit Breaker Co., Schaff Bldg., Phila., Pa., $26,718. Bids Jan. 30. Noted Jan. 8, C.D.—Jan. 16, E.N.-R.

†SWITCHBOARD—**Knoxville, Tenn.**—Tennessee Valley Authority, Knoxville, to Westinghouse Electric & Mfg. Co., Gulf Bldg., Pittsburgh, Pa., main control switch, $19,996; enclosed auxiliary vertical switchboard, $19,223; enclosed terminal switchboards, $4,508 each; 2 switchboards for circuit exciters, $1,859 each; 2 unit auxiliary gage boards, $783 each; and annunciator system, $9,375 each, all above for Wheeler Power Plant. Grand total $70,102. Bids Jan. 27.

MOTOR GRADER—**Tacoma, Wash.**—City, one motor grader, to Western Tractor & Equipment Co., 2230 1st St. S., Seattle, $5,075. Awarded Mar. 5. T. R. Beeman, City Hall, engr.

POWER UNIT GASOLINE ENGINE—**Edgerton, Wis.**—City, 75 hp. industrial power unit gasoline engine, to Wisconsin Fdry. & Machine Co., Madison, $974. Bids Mar. 2. Noted Feb. 21, C.D.

†SEWER PIPE—**Menomonie, Wis.**—Treas. Dpt. Procurement Div., 1,000 lin.ft. 24 in. and 820 ft. 24 in. concrete sewer pipe f.o.b. job or Eau Claire for W.P.A. projects, to E. Fehr, Eau Claire, $1,480 and $1,296 respectively. Bids Feb. 26.

CASTINGS, etc.—**Milwaukee, Wis.**—City, J. W. Nicholson, purch. agt., to Rudisill Fdry. Co., Anniston, Ala., 59 tons special castings, $88.80 per ton***to Filer & Stowell Co., 147 East Becker St., 21 tons offset pipes, $110 per ton; 2 tons tapping sleeves, $281.50 per ton***to Manistee Iron Wks., Manistee, Mich., 3 in. gate and tapping valves at $16.95; 6 in., $18.95; 8 in., $28.50; 12 in., $51.85; 16 in., $100; 2 in. tapping valves, $14.75, disc. 2%***to Crane Co., 225 West Capitol Dr., valve box covers D boxes complete, $4.58; DD boxes, $4.66; covers, 51c.; tops, $1.54; bases, $1.36; DD middle, $1.23; F sections, $1.48***to M. and H. Valve & Fdry. Co., Anniston, Ala., 200 fire hydrants, $63 each. Bids Feb. 20.

†CULVERTS, etc. — **Milwaukee, Wis.** — National Park Service, Milwaukee, galvanized copper steel corrugated culverts for University Park, Madison, to Union Iron Products Co., Elm Grove, $154***pipe, for Copper Falls State Park, Mellon, and for Interstate Park, St. Croix Falls, to Wellsworth Pipe & Supply Co., 4878 North 35th St., $1,844 and $703 respectively***lead for Copper Falls State Park, Mellon, to H. Schiffmann Co., 1428 North Pierce St., $134***cement, for same, to Hansen Lumber Co., Mellon, $298***lumber, hardware, paint for Interstate Park, to Olcott Lumber Co., St. Croix, $676. Grand total $3,809. Bids Mar. 5.

CEMENT, SAND, etc.—**Ottawa, Ont.**—City, supply and delivery of annual supplies, Portland cement, to Canada Cement Co. Ltd., Montreal, Que., at 67½c. per 100 lb.***sand for asphalt plant, to R. R. Foster & Sons Ltd., Ottawa, at 50c. per cu.yd.***sand for roads, treated with oil and tar, Dist. A, to D. Grandmaitre, dumped $1.10 per cu.yd., spread $1.15 per cu.yd.***Dists. B and D, to C. Burnside, dumped $1.14, spread $1.19***Dist. C, to J. H. Spratt, dumped $1.09, spread $1.15***broken stone, Dist. A, to T. Sidney Kirby Co. L... $2,831***Dist. B, to Wright Bros. Supply L... $2,622***Dist. C, to Laurentian Stone Co., S... 020***Dist. D, to R. R. Foster & Son, L... $2,410***to Barrett Bros., white pine lumb... 3x8 in. and 8 to 16 ft., $36 per 1,000; ... pine 3x8 in. and 8 to 16 ft., $40; white p... lumber 3 in. x 12 ft. x 8 ft. to 16 ft., $4... red pine lumber 3x11 in. and 8 to 16 ft., $3... ***to Jas. Davidson Sons, spruce or red p... planks, 2x6 in. x 8 ft. to 16 ft., $33 per 1,00... 2x12 in. x 8 ft. to 16 ft., $45; dressing p... 1,000 ft. B.M., $3***to McDonnell & Conve... spruce or red pine planks, 2x4 in. x 8 ft. ... 16 ft., $28 per 1,000; spruce or red pine plank... 2x10 in. x 8 ft. to 16 ft., $39.25; white pi... 1x6 in. x 8 ft. to 16 ft., $32; white pi... 1x10 in. x 8 ft. to 16 ft., $34.95; weste... cedar, 6x6 in. per lin.ft., 13c.; spruce, 6x6 ... per lin. ft., 11c.; spruce or white or red pi... 8x8 in. x 12 ft. to 18 ft. per lin.ft., 21c.*** waterworks truck, to R. O. Morris, 249 Que... St., $936 net.

FOREIGN

B.W.I., Trinidad—McColl Frontenac Oil C... 360 St. James St., Montreal, Que., constructing oil and gas development, incl. drilling wells, d... labor and separate contracts. To exceed $100,000.

England—Carlisle, Municipality voted to construct 428 houses, $846,000***Stoke-on-Trenton, Education Committee making plans schools, $495,000***Sheffield** Municipality voted to construct 3 schools and clinic, $1,211,725. Bids in April***County Council East Sussex, **Sussex,** making plans institutional home for children, $678,000 voted***Austin Motor Co., Westbourne Rd., Edgbaston, making plans works extension, **Birmingham,** $1,995,000*** M. Dent, Westbourne Rd., **Birmingham,** making plans three theaters, $700,000***Parmiter, Hope & Sugden, Newton Avenue, Longsite, **Manchester,** appointed A. Clayton, archt., 6 Chester Gate, Macclesfield, to prepare plans for works extension, $500,000***Margate Municipality voted $1,065 for sewerage scheme ***Apr. 20, by **Durham** County Council, Shire Hall, erecting secondary schools, $750,000. F. Willey, 34 Old Elvert, archt.***Leeds Municipality erecting 708 houses, to C. H. Dibbin, Ltd., 47 Victoria St., South West London, $1,205,350***F. C. Stark & Co., Little Thurrock, Essex, prepares plans 800 houses, roads, water and sewers, **Grays,** $2,000,000*** Freehold Building & Land Development Co., Ltd., 54 Warwick Sq. Southwest, London, 380 houses, roads, water and sewers, by day labor, **Sunbury - on - Thames,** $1,500,000***Whitby Waterworks Co., **Whitby,** prepares plans constructing 750,000 gal. concrete reservoir at Seaton Castle***Flint** Municipality, prepares plans water supply extension, $400,000*** **Peterborough** Rural Dist. Council, plans by C. Green, for piped water supply to 12 villages, $406,625***Sheffield Gas Co., **Bakewell,** prepares plans extensions to 20 rural parishes, $800,000***Portsmouth** Municipality making plans constructing trolley bus turning point, $450,000***Sheffield** Municipality voted for spring construction feeder mains, $113,250; tractor mains, $32,825***Derby** Municipality invites bids in April, substation equipment, $50,000, transformers, $410,905, boilers and extraction plant, $100,000***Fulham** Municipality making plans and soon takes bids substation alterations and equipment***Grange** Urban District Council taking bids for transformers, $6,400.

England—Lanchester Rural District Council, plans by North East Housing Association, of 1,000 houses, $2,110,000***Beacontree** Municipality constructing 294 houses, to John Knox, Bristol, Ltd., Coronation Rd., Bristol, $602,885 ***Magnesium Elecktron Ltd., **Clifton,** plans magnesium and elektron metal plant, $600,000 ***Billingham** Urban District Council plans converting existing street lighting plant from gas to electricity***Bournemouth** Municipality plans using electricity for heating public buildings***Leeds** Municipality voted $1,110,000 for extending Kirkstone power station and $500,000 for electricity services***Formby** Urban District Coucil in market for eelctric meters, $5,000 voted***Croydon** Municipality voted $834,695 for constructing 33,000 volts ring main***Newcastle-on-Tyne** Municipality voted $2,500,000 for drainage scheme, bids in April***South Shields** Municipality plans 600 houses at Horsely Hall, $1,350,000***Wrexham** Municipality voted $500,000 for town hall, architect not appointed***Wolverhampton** Municipality constructing municipal assembly hall, to H. Willcock & Co., Ltd., Wolverhampton. Lyons & Israel, 34 Vaughn Gardens, Ilford, archts.***East Riding County Council, **Selby,** voted $3,490,000 for bridge over River Ouse*** **Birkenhead** Municipality, plans by Borough Architect, constructing 377 houses and two hundred ten 4 story, tenements, $1,500,000*** Stewarts & Lloyds, **Kettering,** plans 231 houses at Corby, $533,000***Finchley** Municipality plans by borough surveyor for 200 flats on Red Lion Estate, $850,000***Alfa Laval Co., Great West Rd., **Brentford,** plans factory addition, $600,000***I. W. Ellingham, Ltd., Spital St., **Dartford,** in market for electrical power equipment for gravel pits development***Wallace Marchent, 11 Stanley House, Allison House, S.W., London, plans Peace Memorial Hospital addition, **Watford,** $700,000.

England—G. W. deRha Philipe, secy. Madras & Southern Mahratta Railway Co., **London,** in market for six 10 ton hand power traveling

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†Federal Government.

Foreign (Continued)

cranes***G. H. Lillywhite, archts., **London,** preparing plans brewery addition for Charrington & Co., Ltd., Mile End Rd. East, $600,000*** Great Western Railway, Paddington Station West, **London,** preparing plans extending railroad 8 mi. from Shepards Bush to Ealing*** H. T. Fenn, archt., 45 Albermarle St. West, **London,** preparing plans block of flats, Rayners Lane, $500,000***Ashanti Goldfields Corp., Ltd., 10 Old Jewry East, **London,** taking bids constructing power plant a/c and supplying gas electric sets, motor generators, air compressors, etc.***Southern Railway Co., **London,** taking bids supplying and erecting 27 rectifier substation equipment for Portsmouth Main Line electrification scheme***O. L. Roberts, Town Clk., Lambreth Town Hall, Brixton Hill Southwest, **London,** for supplying and laying 11,301 yd. creosoted wood paving blocks***Sheffield Municipality taking bids susbtation equipment $375,000, switchgear $26,000, distribution system extensions $528,315***Walsall** Municipality taking bids supply transformers $23,050*** **Marylebone** Boro Council making plans town hall addition $23,050***Middlesex** County Council making plans North Middlesex County Hospital addition, $2,500,000 voted***Kidderminster** Municipality plans civic aerodrome at Hollbrook***Hill** Municipality voted 292 houses $584,000***W. R. Izat, managing dir. The Bengal & North Western Railway Co., 237 Gresham House, Old Broad St., East Central, **London,** in market for 22,800 tungsten filament lamps.

England—Lavender & Farrell, Malden, Ltd., Worcester Park, plans 700 houses, roads, etc., **Molesey,** $1,500,000***West Coast Residential Estates, Ltd., **Portheawl,** plans by Clough W. Ellis constructing housing scheme at Day-Craig, $1,000,000***H. B. Silver, Silver Estates Ltd., Wealdstone, plans 440 houses, **Hilllingdon,** $900,000***Skelding & Boucher Walsall, plans 300 houses and sewers, **Darlaston,** $847,000*** **Conventry** Municipality plans developing Cheylesmore Estate, incl. 4,500 houses, water, sewers, roads, etc., $10,000,000***W. R. Parkinson, 4 Chapel Walks, **Manchester,** plans 900 houses and theater at Dorylsden, $1,300,000 ***T. F. Nash, Ltd., **Hayes,** plans 3,000 houses, $7,000,000***Leeds** Municipality voted $6,000,000 for new gala swimming baths, covering area of 4,600 sq.yd. suitable for conversion during winter with assembly hall***Huddersfield** Municipality purchasing site and plans erecting $500,000 hospital***Bradford** Municipality plans by Borough Surveyor, 288 houses on Canterbury Ave., $576,000***Harrogate** municipality plans reconstructing Royce Baths, and erecting 2 additional buildings, $650,000 ***Sheffield University Senate, **Sheffield,** appointed Lanchester & Lodge for erecting extensions, $1,000,000***The Governors of Truro Cornwell College, **Truro,** plan school building and science laboratory, $750,000***C. H. Roberts, **Radlott,** plans Berries Estates Housing Development, $610,000***Robert Crombie, **Ipswich,** plans super theater for Union Cinema Co., Ltd., London, $750,000***Eton College Authorities, **Eton,** appointed T. Worthington & Son, Manchester, to prepare plans reconstructing buildings, $1,000,000***The Bacon Development Bd., **Norton,** plans by E. R. Tidmarsh constructing factory, $500,000***Jefferies & Shipley, Kingscourt Bridge St., **Walsall,** plans dairy and milk bottling plant on Midland Rd., Walsall & Dist. Co-Operative Society will purchase equipment***Nuro Ltd., **Biggleswade,** plans factory for manufacturing celluloid and sensitised photograph materials***Bixurcated & Tubular Rivet Co., Ltd., **Aylesbury,** plans large extensions***Midland Box Co., Ltd., 10 Station St., **Mansfield,** plans erecting plant to manufacture boxes, containers, cartons, cases, etc., W. A. Mugglestone, secy.***Secretary, Security Steel Strapping Ltd., c/o T. Goddard & Co., 10 Sargents Inn, East Central, plans metal working plant, **London***Raithby, Lawrence & Co., Ltd., 66 Northcote Rd., **Leicester,** plans printery and lithographic plant and will purchase equipment***Devon** County Council voted $4,460,000 for road construction in 1936, and in market for automatic traffic signals, $30,650 voted*** **Stockton** Municipality voted $485,785, for bridges over main line here***North Riding County Council, **York,** votes $640,000 for constructing dual-driveways, between York and Malton, bridges over North East Ry. at Barton Hill, $930,000***Colchester** Municipality voted $1,011,150 for bridges during 1936***London County Council, **London,** voted $1,800,000 for crossroad construction at Vauxhall***W. T. Developments, Ltd., Common St., East Central, plans by E. T. Deacon of Newbury, for 400 houses, **London,** $910,000***Milk Marketing Bd., **London,** plans plant in Pym's Lane Crewe, $500,000.

England—Exeter County Council voted $625,500 for new city hall, plans ready in April*** G. and R. Thomas Ltd., Hatherton, in market for steam or electric crane with or without gantry to lift 30 tons, also 2 ladles, **Bloxwich** ***Kent Co. Council, **Dartford,** plans constructing 30 ft. tunnel, $1,600,000***Lancashire Electric Light & Power Co., **Keasley,** plans extending power plant and will purchase 50,000 kw. set***Cheshire County Council, **Chester,** appoints Armstead Brown to prepare plans new county building, voted $650,000***J. F. Richardson, county engr., City Hall, **Oxford,** listing names of prospective bidders on 250 houses, $610,000***Bristol** Municipality voted $600,000 for new substation equipment***W. W. Tasker, co. archt., Newcastle-upon-Tyne, plans Northumberland Public Assistance Committee for remodeling poor law institutions, **Moothall,** $575,000 voted***Sutton Dwellings Trust, **Plymouth,** plans 277 houses and flats at St. Budeaut, $720,000.

Germany—W. de Boer & Co., Grosse Allee 9, in market for supply iron nickel ore quantity to be subject to price. Ore to be free of copper and samples should be sent with quotation.

Greece, Athens—Greek Government, reclaiming marsh land and converting into town sites, to Charles Boot Ltd. Sheffield, England.

Holland, The Hague—Director of Municipal Works of The Hague, Bierkade 4, The Hague, and Municipality of Rotterdam, plan laying out aerodrome at Delft, incl. hangars, sheds, workshops, station building, 1,320,000 florins. Colonel H. Walaardt Sacre, Anna Paulownaplein 3, The Hague, is not open to receive bids. Bids will be asked for officially by the authorities later. **(Correction**—Status). Noted Jan. 13, C.D.—Jan. 23, E.N.-R.

Ireland—Ballymena Urban Council plans by Taylor & Wallin, Newcastle-upon-Tyne, England, sewerage system***Bd. Health, **Kildare,** voted $1,500,000 constructing 1,000 cottages*** County Bd. of Health, **Wexford,** voted $714,000 for constructing 900 cottages***Cork** Municipality plans by P. Monahan for building development on Frair's Walk $1,000,000*** **Bangor** Boro Council voted $8,000 for purchase of ejector air compressor plant at $11,000 for gas works machine***Stewart & Partners, Ltd., Shore Rd., **Belfast,** plans 352 houses $528,000 ***Metal Hospital Committee, **Clounmel,** plans by W. A. Dixon, Dublin, for extending hospital, $830,000 voted***Bd. Health, **Wicklow,** voted $833,750 for constructing 707 cottages.

Irish Free State—Dublin Municipality purchases site at Inchicore and making plans sanitorium building $750,000***Dpt. Industry & Commerce, Irish Free State Government, **Dublin,** constructing plant and equipment at 5 distilleries for producing industrial alcohol at Riverstown, County Louth; at Carrickmacross, County Monaghan; at Carndonagh, County Donegal; and at Corroy, near Ballina, County Mayo, to Skoda Corporation of Pilson, Czechoslovakia***Dublin** Municipality plans hydro-electric and waterworks plant on Liffley in connecting with Electricity Supply Bd., $2,500,000***Kildare** Government plans by J. R. Boyd, Barrett, Dublin, 6 story, basement, steel, granite, rein.-con. office building, $600,000***Grangegorman** Mental Hospital Commission voted $3,000,000 for addition.

Isle of Man, Douglas — Borough Electrical Engineer preparing plans extension at Pulrose power station, incl. purchase of new 3,750 kw. turbo-alternator with auxiliaries, house service set, switchgear, etc.

Mexico—Mexican Government, c/o R. Garcia, mayor, and Federal Public Wks., Mexico City, flood control program, levee work, drainage, straightening river bed in places, bridges and trestles, Rio Grande River by day labor, 10,000,000 pesos; plans constructing irrigation dam on San Juan River, 26,000,000 pesos; plans nearing completion irrigation project in lower valley of Rio Grande River, incl. flumes to carry water inland, open ditching, levees, pumping plants, etc., 5,000,000 pesos.

New Zealand, Wellington—May 19, by Secretary Pub. Wks. Supplies & Tenders Committee supplying 3 sets 11,000 volt metal clad switchgear and all accessories; May 19, by Director General, General Port Office, supplying 500 earth plates-copper.

Northern Ireland—Belfast Municipality making plans extending Purdyshume Fever Hospital $850,000***Belfast** Queens University Senate voted $500,000 for addition***Ranks, Ltd., **Limerick,** constructing mill, to McCaffery & O'Carroll, Ltd., $495,000.

Palestine, Jerusalem—American Jewish Hadassah plans hospital, $500,000; Governors of Hebrew University plan medical building and purchasing equipment, $600,000.

Rumania—Steauarmoania Oil Co., Bucharest plans constructing bulk oil storage, tanks and facilities, in Ploesti Oil Dist. $500,000 or more.

Scotland — Lanark County Council voted $8,000,000 for road and bridge construction at Millerston, $885,000; at Strathaven, $180,000; at Bishopbriggs, $66,500 and at Kirkenfieldbank, $440,000, bids to be taken in April*** **Aberdeen** Municipality decides to substitute vehicle actuated electric traffic signals, 5,750 each, to be installed in business centers*** George Stewart, **Blantrye,** plans 800 houses at Saughton near Edinburgh, $1,800,000***Dunfermline** Municipality voted $1,847,000 for 874 houses***Alloa** Municipality voted $1,240,000 for constructing 562 houses***Glasgow** Municipality voted $600,000 for metal hospital additions.

Scotland—Motherwell Municipality plans enlarging plant and cable capacity and converting to a/c supply of 4 areas of the burgh and laying additional cables. Tenders to be called end of March***Aberdeen University Authorities Comn., **Aberdeen,** Pite Son & Fairweather, 12 Carteret St., London, to prepare plans medical building $750,000***J. W. Laird & Napier, 219 St. Vincent St., Blythswood, preparing plans super theater, St. George's Road, **Glasgow,** $610,000.

Scotland, Glasgow — Associated British Cinemas Ltd., Golden Square West, London, England, plans by staff architect W. R. Glew, constructing theater, $600,000.

South Africa, Bloemfontein—Apr. 6, by Municipality supplying, erecting boiler house and equipment incl. 2 stoker fed boiler units, mechanical draught plant, dust extraction plant.

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†*Federal Government.*

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½ yd.	30
⅝ yd.	38
¾ yd.	45
⅞ yd.	52
1 yd.	62
1¼ yd.	65

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Foreign (Continued)

ash handling plant, piping and valves, steel framed building.

South Africa, Johannesburg—Dpt. P. Wks., making plans magistrates court building, $2,000,000. Law Court addition, $55,000, railway administration building addition $340,000, Miners Phthis Building $30,000, Railway Police Barracks $42,500, and S.A. Police Barracks 30,000***Orlando Municipality making plans 1,000 native houses $600,000, public hall $30,000, public baths $15,000, and market building $15,000***Salby Municipality making plans workshops $400,000, hotel at Wolhuter $75,000, and native bazaar $150,000***Sydney Clow & Co., **Johannesburg**, prepares plans office building $650,000; Reserve Bank Ltd. plans commercial building $605,000; Commercial Exchange Ltd. plans offices $151,825***African Broadcasting Co., Ltd., prepares plans studios $875,000.

Switzerland—S.A. de Products pour la Photographie Telko, **Freiburg**, plans 600,006 francs plant for manufacturing photographic papers and films***Electrona A.G., **Solothurn**, plans $100,000 plant for manufacture of chemical and electrotechnical products.

Turkey—Syndicate, c/o Faik Kurtoglu, Minister of Economy, Turkish Government, Ankara, Turkey, plans constructing iron and steel mills. To exceed $5,000,000.

Wales, Cardiff—Municipality plans constructing deepwater entrances to Cardiff and Penarth Docks, $13,750,000. G. Williams, chn. of Committee***J. Simmons & Sons, archts., 5 Regent Terrace, Doncaster, plans developing Perry's Mine Estate, **Holywell**, $1,000,000.

PUBLIC BUILDINGS

PROPOSED WORK

★ **Calif., Los Angeles**—Los Angeles Bd. Educ. plans by H. L. Gogerty and C. E. Noerenberg, 6272 Yucca St., new high school in Western District or Western District High School, $500,000; plans by T. C. Kistner, 814 Architects Bldg., new school building and girls' physical education building at John Adams, Jr., High School, 151 West 30th St., $175,000; plans by A. C. Martin, 233 Higgins Bldg., new Abraham Lincoln High School, North Broadway and Mission Rd., $667,000.

Conn., Ansonia — City, E. W. Webb, chn. School Comn., rejected bids Feb. 18, 3 story, basement, 154x303 ft., brick, stone, concrete high school, Howard Ave. and Crescent St., $423,000. P.W.A. project. Will readvertise. W. Lescaze, 211 East 48th St., New York, N. Y., archt. Noted Feb. 28. C. D.—Feb. 6, E. N.-R.

Conn., Greenwich—Bd. Selectmen, Town Hall, receiving, competitive plans from architects in Greenwich, for brick, steel, stone central fire station, $140,000. E. B. Caldwell, 1029 Fairfield Ave., Bridgeport, consult. archt.

Kan., Russell—School District 5, O. Ostrum, clk., plans by Mann & Co., Hutchinson, rein.-con., native lime stone and brick high school, $226,400. **Maturity indefinite.** Awaiting action on P.W.A. grant for $101,800. District voted $124,000 on Sept. 30, 1935, for same. If grant is not allowed, probably will submit large bond issue to voters this spring.

†Md., Baltimore—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids altering U. S. Custom House, Gay and Water Sts., $90,000.

★ **Mass., North Adams** — City, W. Johnson, mayor, City Hall, plans municipal electric plant, $1,000,000. **Maturity indefinite.** Engineer not appointed.

Mo., Clayton (St. Louis P. O.)—City, c/o B. Greensfelder, pres. Public Library Bd., soon takes bids 2 story, basement, rein.-con., brick, stone library, $100,000. $55,000 loan and $45,000 grant from P.W.A. M. Boulicault, Ambassador Bldg., 411 North 7th St., St. Louis, archt. Noted Sept. 11, C. D.—Sept. 19, E. N.-R.

N. J., Chatham—Town voted $208,000, for high school, for Bd. Educ., H. A. Burgess, pres., W. A. Pieper, Chatham, archt. Noted Nov. 28, C. D.—Dec. 6, E. N.-R.

N. Y., Gouverneur—Union Free School Dist. 1 bids after Mar. 15, constructing superstructure for high school. Total est. $223,986, incl. equipment. P.W.A. project. D. K. Sargent, 212 Harrison St., Syracuse, archt. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

N. Y., Johnson City—Bd. Educ. soon takes bids constructing Lincoln Elementary School, $285,000. Site not selected. W. H. Whitlock, 607 Chenango St., Binghamton, archt. Noted Jan. 27, C. D.—Jan. 30, E. N.-R.

†N. Y., Poughkeepsie—Treas. Dpt. at office Sup. Archt., Wash., D. C., soon takes bids constructing 225x285 ft. post office, Mansion St. opposite New Market St. Site selected. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

★ **N. Y., Syracuse**—City, R. D. Martin, mayor, City Hall, plans fire station, West Genesee and Wallace Sts., $600,000. Architect not appointed.

N. Y., Utica — Bd. Educ., City Hall, temporarily abandoned plans for constructing Kernan School, $351,000. Owners waived P.W.A. allotment. Gouge & Ames, 70 Genesee St., archts. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

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N. Y., Warsaw—Bd. Supervs. Wyoming Co., Warsaw, plans county building. Est. about $125,000. Architect and engineer not appointed.

†N. Y., West Point — Con. Q.M., Military Academy, West Point, plans constructing fire station. U. S. Military Academy, $50,000. **Maturity this year.**

†N. Y., West Point—Con. Q.M., U. S. Military Academy, West Point, plans constructing buildings at U. S. Military Academy, $50,000. **Maturity indefinite.**

†Okla., Fort Sill—Con. Q.M. plans completed constructing quarters addition.

Pa., Dunmore—Dunmore School Bd. T. Flanelly, pres., plans and specifications for new high school approved by board, $200,000 or more. J. Howley, Scranton, archt.

Pa., Erie—Comrs. Erie Co., construction of 2 story county tuberculosis hospital, Gore and Lake Pleasant Rds., was temporarily abandoned in 1935 when County Commissioners refused to include county's share of cost in appropriation. Commissioners have now included $78,000 appropriation in 1936 budget for its share of cost. P.W.A. application will be revived. Est. $140,000. F. A. Fuller, Commerce Bldg., archt., has been authorized with final plans and specifications. **Maturity in early summer.** Noted Aug. 6, C. D.—Aug. 8 E. N.-R.

†Pa., Lewisburg—Prison Industries, Inc., Wash., D. C., plans constructing 3 story, 62x202 ft., steel, concrete factory, 36,000 sq.ft. floor space, for manufacturing metal furniture, incl. installing metal working and chrome plate and nickel plating equipment. $65,000. H. C. Hill, warden.

Pa., Pittsburgh — Bd. Educ., Administration Bldg., completing plans brick, steel and tile Liberty Elementary and Junror High School, Ellsworth Ave., $440,000. Advertise for bids in April or May.

Tenn., Lebanon—Bd. Educ. plans high school, site of old high school. $140,000. Architect not appointed.

†Tex., Fort Sam Houston—Con. Q.M. soon takes bids constructing quarters, etc.

Tex., Huntsville—City, J. M. Smith, mayor, plans completed and takes bids after Apr. 1, constructing municipal light and power plant and street lighting system, incl. 2 story, 40x70 ft., steel frame and structural clay tile plant, three 300 hp. Diesel engines, plumbing, heating and wiring. $151,000. Garrett Eng. Co., 300 Hughes St., Houston, and c/o owner, engrs. Noted Oct. 2, C. D.—Oct. 10, E. N.-R.

Vt., Brandon—Town, Town Clerk, voted to abandon plans for municipal power plant. Noted Oct. 10, C. D.—Oct. 17, E. N.-R.

Vt., Montpelier — City, R. C. Bowers, City Hall, plans grade school, $150,000. Architect not appointed. Site not appointed.

†Wis., Port Washington—Treas. Dpt. at office Sup. Archt., Wash., D. C., making plans constructing U. S. Post Office, $70,000.

★ **Alta., Edmonton**—Municipality, I. M. Miller, city clk., plans by James M. Robertson, 1440 Ste. Catherine St. W., constructing addition to power plant, $1,000,000.

Alta., Edmonton—R. Christie, supt Municipal Telephone System, plans early modernization of No. 8 Exchange, $171,000 voted.

★ **Sask., Saskatoon** — Saskatchewan Power Comn., Parliament Bldgs., Regina, prepares plans new power unit, $600,000.

BIDS ASKED

†Ala., Birmingham—Mar. 24 (extended date), by P. Wks. Administration, Div. Housing, Wash., D. C., constructing foundations to bottom of 1st floor slab for 81 buildings, 5 to have basements, for Smithfield Court Housing Project, North 8th Ave., Project H-2902. Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Ala., Montgomery—Mar. 30 (extended date), constructing 2 story, basement, 131x311 ft., brick, rein.-con. city hall, Perry and Monroe Sts. $475,000. P.W.A. project. F. Lockwood, 121 Adams St., archt. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

Ark., Paragould—Mar. 25, by City, W. C. Middleton, mayor, remodeling waterworks power house, concrete machinery foundations, rein.-con. oil storage tank and atmospheric cooling towers, Diesel engine generator plant, 3 units, incl. switchboard, wiring, piping, etc., complete electric distribution system, furnishing and installed, incl. meters, service connections, street lighting, whiteway, etc. $160,000. P.W.A. project. W. A. Fuller Co., 2916 Shenandoah Ave., St. Louis, Mo., engrs.

†Ark., Van Buren—Apr. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, $68,000.

Colo., Boulder—Mar. 30, by Secretary School Bd., 2 and 3 story, small basement irregular sized, brick, stone, rein.-con. high school, $385,000. Frewen & Morris, Midland Savings Bldg., Denver, archts. Noted Oct. 31, C. D.—Nov. 7, E. N.-R.

★ **Conn., Norwalk**—Mar. 28, by City, at office of L. Downs, city clk., for Norwalk High School, brick, steel, stone, East Ave. $909,000. P.W.A. project. Tooker & Marsh, 101 Park Ave., New York, archts. J. L. Burley, Lime Hill Rd., engr. Noted Nov. 26, C. D.—Nov. 21, E. N.-R.

Ill., Urbana—Mar. 25, by Bd. Educ., High School Bldg., equipment Groups A, B, D and K elementary school. P.W.A. project. Smith, Kratz & Strong, Urbana, archts.

†Ill., Marseilles—Apr. 14, by Treas. Dpt., office Sup. Archt., Wash., D. C., constructing U. S. Post Office, $67,000. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Ill., Zion—Mar. 30, by School Dist. 6, O. Farley, pres., 2700 Sheridan Rd., construct 2 schools, $184,000. P.W.A. project. J. Chubb, 109 North Dearborn St., Chicago, archt.

†Ind., Franklin—Apr. 7, by Treas. Dpt., office Sup. Archt., Wash., D. C., constructing U. S. Post Office, $74,000.

†Ind., Delphi—Mar. 31 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Feb. 24, C. D.—Feb. 2, E. N.-R.

†Ind., Knightstown—Apr. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, $65,000; adv. E. N.-R. Mar. 19.

†Ia., Waverly—Apr. 6 (extended date), by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. Noted Feb. 24, C. D.—Jan. 16, E. N.-R.

†Me., Togus—Apr. 21, by Veterans Administration Construction Service, Arlington Bldg., Wash., D. C., 3 story, basement, 104x110 ft., concrete, rein.-con., brick, steel, barracks and recreation building on concrete piles, Veterans Hospital, $350,000.

†Mass., Chicopee Falls—Apr. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, $83,000. Noted Oct. 21, C. D.—Oct. 24, E. N.-R.

†Mass., Gloucester—Apr. 1, by U. S. Coast Guard, Headquarters, Wash., D. C. general contract 1 story, 30x58 ft. frame boathouse, 240 ft. timber launchway on wood piles, demolishing existing boathouse, at U. S. Coast Guard Station.

Mass., Holyoke — Mar. 24, by City, W. F. Yoerg, mayor, City Hall, 1 and 2 story, basement, 100x180 ft., brick, steel, stone, (war memorial), auditorium building, concrete footing, Appleton and Maple Sts. $215,000. P.W.A. project. Franz & Cunniff, 316 High St., archts.

†Mo., Fredericktown—Apr. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, $64,000; adv. E. N.-R. Mar. 19.

†Mo., Kansas City—Apr. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing temporary quarters for activities now located in present post office.

Mo., St. Louis—Apr. 14, by Bd. P. Serv., City Hall, constructing 1 story, 68x143 ft., rein.-con., brick, police station and garage for 9th Police Dist., Lucas Ave. between Cardinal and Garrison Sts. $125,000. A. Osburg, city archt. W. C. E. Becker, city engr. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

N. Y., Alden—Mar. 26, by Union Free School Dist. 10, constructing school. To exceed $140,000. P.W.A. project. Bley & Lyman, 505 Delaware Ave., Buffalo, archts. P.W.A. project, adv. E. N.-R., Mar. 19. Noted Nov. 26, C. D.—Dec. 5, E. N.-R.

N. Y., Berlin—Mar. 27, by Bd. Educ., Central School Dist. 1, towns of Berlin and Petersburg, Rensselaear Co., general contract school, $147,500. Bids Feb. 29 rejected. P.W.A. project. H. O. Fullerton, 152 Washington Ave., Albany, archt.; adv. E. N.-R., Mar. 19. Noted Mar. 11, C. D.—Mar. 19, E. N.-R., under "Contracts Awarded."

N. Y., Brooklyn—Mar. 25, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. Extension and Concord St., plumbing, drainage, heating, ventilating, lighting fixtures for P. S. 49, Graham Ave., Maujer and Scholes Sts., for Bd. Educ., 500 Park Ave., New York. $332,090. P.W.A. project.

N. Y., Dongan Hills—Apr. 2, by Dpt. Hospitals, 125 Worth St., New York, general contract elevators, plumbing, kitchen refrigerators, electrical work and fixtures, for new Children's Hospital, at Sea View Hospital, Richmond Boro.

†N. Y., Fort Edward—Apr. 9, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, $66,000. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

†N. Y., Fort Hancock—Mar. 28, by Con. Q.M., Gouvernors Island, air conditioning for Fort Hancock.

★ **N. Y., New York**—Mar. 25, by W. C. Martin, archt. and supt. School Buildings, Flatbush Ave. Extension and Concord St., Brooklyn, general contract Bronx Industrial High School for Girls, Tinton and Union Aves., East 161st and 163rd Sts., for Bd. Educ., 500 Park Ave., New York. $976,000. P.W.A. project.

N. Y., New York—Apr. 3, by Dpt. Hospitals, 125 Worth St., general contract elevator, plumbing, kitchen equipment, refrigeration, heating, ventilating for superstructure of central nurses' residence, Welfare Island. P.W.A. project. Morris & O'Connor, 101 Park Ave., archts.

★ **N. Y., Stamford**—Mar. 23, by Bd. Educ., excavating, foundation, grading for school, River St. $500,000. P.W.A. project. H. O. Fullerton, 152 Washington Ave., archt. Bids about Apr. 15 on superstructure; adv. E. N.-R. Mar. 19. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

N. Y., Wallkill—Apr. 2 (extended date), by Dpt. Correction, State Office Bldg., Albany, constructing dairy farm buildings at Wallkill Prison. W. E. Haugaard, State Office Bldg., Albany, archt. T. F. Farrell, Albany, engr. Noted Feb. 19. C. D.—Feb. 27, E. N.-R.

†*Federal Government.*

Public Buildings (Continued)

†N. Y., **Walton**—Apr. 10, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $82,000. Noted Nov. 27, C. D.—Dec. 5, E. N.-R.

N. Y., **Woodlawn** — Apr. 1, by Union Free School Dist. 13, Hamburg, general contract, plumbing, heating, electrical work for school, $152,000. P.W.A. project. Bley & Lyman, 505 Delaware Ave., Buffalo, archts. Noted Dec. 2, C. D.—Dec. 5, E. N.-R., under "Contracts Awarded."

†N. C., **Oteen**—See "Contracts Awarded."

†Pa., **Duquesne**—Apr. 13, by Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office. $104,000.

†Pa., **New Castle**—Mar. 31, by Treas. Dpt. at office Sup. Archt., Wash., D. C., clearing site for U. S. Post Office.

★ Pa., **Scranton**—Mar. 23, by Scranton School Dist., J. Eckersely, secy., constructing Junior High School at Maple St. and Slocum Ave., $997,000. Previous estimate was $1,250,000. Former contract rescinded. New estimates general contract $717,840; heating and ventilating $119,640, plumbing $99,700, electrical work $59,820. J. J. Howley, Scranton, archt. T. R. Williams, c/o owner, engrs. Noted Mar. 10, C. D.—Mar. 12, E. N.-R.

R. I., **Providence**—Brady Electric Co., electrical contractor, 49 Westminster, taking bids for furnishing elevator in Mt. Pleasant Ave. Senior Regional High School now under construction, for City, Bd. Contr. & Supply, P. F. Mahoney, City Hall. Noted Jan. 8, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

†Tenn., **Memphis**—Apr. 7, by P. Wks. Administration, Div. Housing, Wash., D. C., constructing foundations for Lauderdale Courts Housing Project, Project H-3403. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

Tenn., **Nashville**—May 6, by L. Hickman, Judge Davidson Co., at temporary court house, 8th Ave. N., furnishing, erecting jail equipment for public building and court house, City Square, P.W.A. project. Noted Feb. 19, C. D.—Feb. 27, E. N.-R.

Tenn., **Winchester**—Mar. 26, at office J. B. Templeton, County Court, Franklin Co., constructing court house. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

†Va., **Fredericksburg** — Apr. 14, by Treas. Dpt. at office Sup. Archt., Wash., D. C., extending and remodeling U. S. Post Office. $155,000.

Wis., **Wyoneena**—Mar. 26, by Columbia Co., 2 story, basement, 44x161 ft. and 44x198 ft. hospital for insane additions, brick, steel, plain found., $175,000. Storck & Schneider, Madison, archts.

†**Canal Zone**—Apr. 25 (extended date), by Con. Q.M., Panama Canal, Balboa Heights, C. Z., constructing auditorium building at Christobal; quarters for lock guards at Gatun, incl. 1 barrack building and officers' quarters; quarters for lock guards at Pedro Miguel, incl. 1 barrack building and officers' quarters; 1 storage shed and barrack building and officers' quarters at Miraflores; 1 gas production plant at Balboa; 2 Ward Buildings 18 and 19, at Leper Colony, at Palo Seco and one Ward Building 19. Noted Feb. 24, C. D.—Feb. 27, E. N.-R.

†T. H., **Pearl Harbor**—Mar. 25, by Yards & Docks, Navy Dpt., Wash., D. C., remodeling building and electrical equipment at Navy Yard, Spec. 8051.

CONTRACTS AWARDED

Ala., **Dothan**—Bd. Educ. Houston Co., Dothan, constructing 8 additions and 4 new schools, brick, brick veneer, to H. G. Dempsey, Piedmont, $163,000. **P.W.A.** Noted Mar. 3, C. D.—Mar. 5, E. N.-R.

Conn., **Bristol**—Loucks & Clarke, general contractors, 6 Ernest St., Wallingford, roofing for brick and steel addition to Clarence A. Bingham's School, to Johnson Lindahl, Inc., 99 Franklin Ave., Hartford, for City, School Dist. 2, building finish, to New Britain Woodworking Co., 55 Pearl St. Noted Feb. 5, C. D.—Feb. 13, E. N.-R., under "Contracts Awarded."

Conn., **Old Saybrook**—Preretti Bros., general contractors, Centerbrook, excavating for school, to Lamay Co., Old Saybrook for Town, G. B. Smith, Bd. Selectmen. **P.W.A.** Noted Mar. 2, C. D.—Mar. 5, E. N.-R., under "Contracts Awarded."

Conn., **Storrs**—State, Connecticut State College, Storrs, installing electric light wiring in building and 1,417 new electric light outlets in 35 residential buildings and 7 new services, etc. in farm buildings, to T. J. Ealahan, 399 Ocean St., New London, $5,969. Bids Mar. 3, awarded Mar. 5. Noted Feb. 21, C. D.—Feb. 27, E. N.-R.

Conn., **West Hartford** (br. Hartford)—Town, R. L. Loomis, mgr., furnishing, installing automatic passenger elevator in new town hall, to Otis Elevator Co., 244 Pearl St., Hartford, $4,456. Bids Mar. 2, awarded Mar. 7. Noted Mar. 11, C. D.—Feb. 27, E. N.-R.

†D. C., **Wash.**—Treas. Dpt. at office Sup. Archt., Wash., D. C., altering and constructing cove lighting system additions in Dpt. of Justice Building, to H. P. Foley Co., 2020 Eye St., $13,833.

†D. C., **Wash.**—G. A. Fuller Co., general contractors, Munsey Bldg., 3,500 tons structural steel for Federal Reserve Building for Federal Reserve Bank, Treas. Dpt., Wash., D. C., to Bethlehem Steel Co., Bethlehem, Pa. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

Ga., **Columbus**—City, constructing School 1, to J. P. Bradfield, Columbus, $172,447***School 2, to C. E. Cooper, Columbus, $21,047***School 3, to Georgia Electric & Constr. Co., Columbus, $12,677. Grand total $206,171. **P.W.A.** Noted Nov. 22, C. D.

Ill., **Elgin**—Dpt. P. Wks. & Buildings, Div. Architecture & Eng., Springfield, to E. J. Corbey Co., 405 East Des Plaines St., Chicago, plumbing in staff house for Elgin State Hospital, $13,400***to Illinois Fireproof Covering Co., 316 West Kenzie St., Chicago, pipe covering, $1,088***to Divane Bros., 3826 Van Buren St., Chicago, electrical wiring, $7,460***to Hanley Co., 1503 South Michigan Ave., Chicago, heating, $4,789; heating for Ward Building, $9,327***to Fettes, Love & Sieben, 4105 East Damon Ave., Chicago, plumbing for Ward Building, $10,400***to Mid-States Industrial Corp., 2401 11th St., Chicago, pipe covering, $2,376; electrical work, $5,385; plumbing for staff building, $5,385. Grand total $55,041. **P.W.A.** Bids Feb. 21. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Ill., **Manteno**—Div. Architecture & Eng., Dpt. P. Wks., Springfield, Feb. 21, heating for mechanical stores building, to Industrial Corp., 2401 11th St., Rockford, $6,214***plumbing, to Klein & Heckman, Inc., 108 North Galena Ave., Dix, $7,994***pipe covering, to Prillman, Inc., 414 New St., Joliet, $1,977***electrical wiring to Harmon Electric Co., 724 South Cicero Ave., Chicago, $6,197***elevator equipment, to Montgomery Elevator Co., 30 20th St., Moline, $3,837. Grand total $36,239. **P.W.A.** Bids Feb. 21. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

Ind., **Evansville**—Bd. Comrs. Vanderburg Co., E. D. Koenmann, aud., general contract 2 story, basement, hospital addition, to Rust Constr. Co., 500 Furniture Bldg., $160,484. **P.W.A.** Bids Mar. 7. Noted Jan. 30, C. D.—Feb. 6, E. N.-R.

Ind., **Michigan City** — Bd. School Trustees, general contract 1 story, 110x180 ft. high school addition, to Tonn & Blank, 104 North Franklin St., Michigan City, $188,156***heating, plumbing and ventilating, to J. D. Gangwer, Laporte, $30,784***electrical wiring, to Bradford Electric Co., Chicago, Ill., $8,880. Grand total $227,820. **P.W.A.** Bids Jan. 7.

Md., **Baltimore**—M. A. Long Co., general contractors, 10 West Chase St., 500 tons structural steel for Eastern High School, Venable Park, to American Bridge Co., Frick Bldg., Pittsburgh, Pa., for City, City Hall.

Mass., **Medford**—M. S. Kelliher Co., general contractors, 38 Chauncy St., Boston, 250 tons structural steel for new city hall, to Lehigh Structural Steel Co., Allentown, Pa., for City, J. J. Irvin, mayor, City Hall. Noted Feb. 21, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Mass., **Waltham**—Thomas O'Connor & Co., general contractors, 238 Main St., Cambridge, heating for ward building, surgical wing and dining rooms for Middlesex County Comn., Court House, Cambridge, to J. J. Hurley & Co., 104 Broadway, Boston***plumbing, to C. H. Cronin, Inc., 14 Byron St., Boston***electrical work, to Quinn Bros., 239 A St., Boston***structural steel, to Lehigh Structural Steel Co., Franklin St., Boston***reinforcing steel, to Concrete Steel Co., 294 Washington St., Boston***roofing, to Burgess & Blacher Co., 18 Eustis St., Roxbury***paint, to H. Newton Marshall Co., 522 Harrison Ave., Boston***elevators, to Otis Elevator Co., 130 Clarendon St., Boston***tile, terrazzo, to Rinaldi Tile Co., Inc., 326 Main St., Cambridge***cast stone, to Emerson & Norris Co., 163 North Beacon St., Brighton, Boston. Noted Feb. 17, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

Minn., **Cambridge**—State Bd. Contr., L. G. Foley, chn., State Office Bldg., St. Paul, general contract one 153x35 ft. and 76x154 ft. cottages, both 2 story, basement, at State Colony for Epileptics, to Midwest Contg. Co., 748 Builders Exch. Bldg., Minneapolis, $178,874***heating, plumbing and ventilating, to P. J. Gallagher & Sons, Faribault, $35,280***wiring, to Maier Electric Co., 529 South 8th St., Minneapolis, $6,299. Grand total $220,453. **P.W.A.** Bids Feb. 27. Noted Feb. 20, C. D.—Oct. 3, E. N.-R.

Mo., **Fulton**—State Hospital 1, Fulton, and Bi-Partisan Advisory Bd. of State Bldg. Comn., Jefferson City, general contract two 4 story, basement, 39x137 ft. and 30x41 ft., rein.-con., brick, stone hospital ward wing, to John Epple Constr. Co., Columbia, $303,000. **P.W.A.** Bids Feb. 13. Noted Feb. 26, C. D.—Feb. 6, E. N.-R.

Mo., **Overland**—E. A. Brunson Constr. Co., general contractors, Railway Exchange Bldg., St. Louis, brick work for 1 story, 35x85 ft., brick high school addition for Ritenour Consolidated School Dist., H. F. Buder, pres., Forest and Marshal Aves., to W. Abram, 2345 Woodson Rd.***rubble masonry, to A. M. Thom, 7939 Lansdowne St., St. Louis***steel and iron, to Atlas Iron Co., 4020 Geraldine St***roofing, to Certainteed Products Corp., 1531 North 11th St., St. Louis***hardware, to Melcher-Schene Hardware Co., 4800 Natural Bridge St., St. Louis***plastering, to H. Niehaus Plastering Co., Louderman Bldg., St. Louis***weatherstrips to American Screen & Weatherstrip Co., 1617 Lafayette St., St. Louis***painting, to Brennan, Yengst & Hanon, 4907 Easton St., St. Louis***glazing, to Pittsburgh Plate Glass Co., 3900 Chouteau St., St. Louis***plumbing, to Moore Plumbing Co. 4466 Finney Ave., St. Louis. Noted Feb. 14, C. D.—Feb. 20, E. N.-R. under "Contracts Awarded."

N. J., **Marlboro**—Dpt. Institutions & Agencies, Trenton, furnishing, delivering expanded metal window guards, for state hospital, to Ornamental Iron Co., 45 Muirhead Ave., Trenton, $6,148. **P.W.A.** Noted Nov. 6, C. D.—Nov. 14, E. N.-R., under "Contracts Awarded."

N. Y., **Bath**—F. Gleason Co., general contractors, 108 Colvin St., Rochester, roofing for hospital for Village, Village Hall, to Flesch & Schmitt, Inc., 60 Brown St., Rochester***structural steel, to Genesee Bridge Co., 344 West Ave., Rochester***Ornamental iron, to Guarantee Iron Wks., 16 Railroad St., Rochester. **P.W.A.** Noted Jan. 13, C. D.—Jan. 16, E. N.-R., under "Contracts Awarded."

N. Y., **Berlin**—Central School District 1, general contract central school building, to Stone Bros. Building Co., 1814 Highland Ave., Troy***heating, to Hamaline Co., Inc., 529 West Oriskany St., Utica***plumbing, to Cohn & Kramer, Inc., 48 Grand St., Albany***electrical work, to Devoe Electric Co., 93 4th St., Troy. Est. $198,000. **P.W.A.** Noted Feb. 19, C. D.—Aug. 29, E. N.-R.

N. Y., **Brooklyn**—G. F. Driscoll Co., general contractor, 550 Union St., 1,800 tons structural steel for P. S. 239, for Bd. Educ., 500 Park Ave., New York, to Bethlehem Steel Co., Bethlehem, Pa. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

N. Y., **Brooklyn**—Psaty & Fuhrman, general contractors, 369 Lexington Ave., New York, 1,000 tons structural steel, for P. S. 234, for Bd. Educ., 500 Park Ave., New York, to Lehigh Steel Corp., Allentown, Pa. Noted Feb. 10, C. D.—Feb. 13, E. N.-R.

N. Y., **Jamaica**—Bd. Transportation, J. H. Delaney, chn., 250 Hudson St., New York, furnishing, installing heating system in Jamaica Yard Buildings, to W. J. Olvany, Inc., 100 Charles St., New York, $67,622. **P.W.A.** Bids Feb. 18. Noted Jan. 31, C. D.—Feb. 6, E. N.-R.

N. Y., **Ogdensburg**—Bd. Educ., foundations for Senior High School, to R. A. LaLonde, Ogdensburg. Total est. $180,000. **P.W.A.** Soon takes bids on superstructure. Randell & Vedder, S. A. & R. Bldg., Syracuse, archts. Noted Jan. 24, C. D.—Jan. 23, E. N.-R.

N. Y., **Rockaway**—Dpt. Hospitals, Municipal Bldg., New York, heating, ventilating for power plant at male dormitory and laundry and altering main building at Neponsit Hospital, to Jarcho Bros., Inc., 215 East 37th St., New York, $139,277. Subject to P.W.A. approval. Bids Feb. 17. Noted Feb. 18, C. D.—Feb. 13, E. N.-R.

N. Y., **Tonawanda**—Metzger Constr. Co., general contractors, 429 Carlton St., Buffalo, excavating for school, for Bd. Educ., Clinton and Morgan Sts., to R. E. Williams & Sons Co., Inc., 303 Grote St.***reinforcing steel, to Truscon Steel Co., 775 Main St., Buffalo***steel joists, to Bethlehem Steel Co., 1215 Hamburg Turnpike. Total est. $142,745. **P.W.A.** Noted Dec. 11, C. D.—Dec. 19, E. N.-R.

N. Y., **West New Brighton**—Psaty & Fuhrman, general contractors, 369 Lexington Ave., New York, 800 tons structural steel, for Curtis High School addition, Hamilton Ave., for Bd. Educ., 500 Park Ave., New York, to Lehigh Structural Steel Co., Allentown, Pa. Noted Feb. 10, C. D.—Feb. 13, E. N.-R., under "Contracts Awarded."

N. Y., **West Valley**—Metzger Constr. Corp., general contractors, 429 Carlton St., Buffalo, reinforcing steel for grade and high school, to Truscon Steel Co., 775 Main St., Buffalo, for Central School Dist. 4; steel joists, to Bethlehem Steel Co., 1215 Hamburg Turnpike, Lackawanna. Noted Dec. 17, C. D.—Dec. 26, E. N.-R.

†N. C., **Oteen**—Veterans Hospital, constructing warehouse, relief labor. $40,000. **W.P.A.**

O., **Ironton**—Lawrence Co., constructing hospital building, to Norton & Nadalin Co., Columbus, $125,000. **P.W.A.** Noted Mar. 11, C. D.—Mar. 19, E. N.-R.

O., **Sandusky**—Erie Co., 3 story, basement, stone, steel court house addition, to Steinle-Wolfe Co., 1515 Croghan St., Fremont, $101,101. **P.W.A.** H. C. Millott, 814 Washington St., archt. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

†Ore., **Baker**—L. Hoffman Constr. Co., general contractors, 715 Southwest Columbia St., Portland, excavation for U. S. Post Office, to R. J. Heriza, Baker, for Treas. Dpt. at office Sup. Archt., Wash., D. C***concrete, to W. McWaters, Baker***plumbing, heating, to Urban & Sinnott, Portland***ornamental iron, to Portland Wire & Iron Wks., 4644 Southeast 17th St., Portland***roofing and sheet metal, to Reuter & Sons, Portland***painting, to Landroth & Boorse, Baker***tile, to Carlton Tile Co., Portland***electrical wiring, to Grasle Electric Co., Lumberman's Bldg., Portland***mill work, to Shockley Lumber Co., Baker***marble, to Lutz Marble Co., 3900 Northwest St. Helens Rd., Portland. Noted Oct. 10, E. N.-R., under "Contracts Awarded."

★ †Pa., **Coatesville**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing Infirmary Building 38, and Semi-Acute Building 39, incl. plumbing, heating, electrical work, Item 1 and Alternate C under Item 1, to Sinclair & Grigg, Inc., 1518 Walnut St., Phila., $534,500. Bids Mar. 3. Noted Mar. 6, C. D.—Jan. 30, E. N.-R.

†Pa., **Phila.** — Yards & Docks, Navy Dpt., Wash., D. C., constructing combustion control

Federal Government.

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Public Buildings (Continued)

system at Navy Yard, Spec. 8147, to Brooke Eng. Co., 175 West Huntington St., $7,873. Bids Feb. 26. Noted Mar. 3, C. D.—Feb. 13, E. N.-R.

R. I., Howard (Cranston)—State, Emergency P. Wks. Comm., State House, Providence, general contract 3 story, basement, brick, steel, stone medical and surgical building at Mental Hospital, to Tucker Constr. Co., 346 Washington St., Providence, $335,300***heating and plumbing, to J. F. Martin Plumbing & Heating Co., 236 East Ave., Pawtucket, $23,000 and $37,400 respectively***electrical work, to New England Machine & Electric Co., 77 Bayley St., Pawtucket, $28,370. Grand total $424,070. **P.W.A.** Bids Jan. 25, awarded Mar. 5. Noted Feb. 4, C. D.—Jan. 30, E. N.-R.

†**R. I., Wakefield**—New England General Contg. Co., general contractor, 341 State St., New Haven, Conn., heating for U. S. Post Office, Orchard Ave. and Robinson St., for Treas. Dpt. at office Sup. Archt., Wash., D. C., to Mayflower Heating Corp., 364 Asylum St., Hartford, Conn.***plumbing, to O. Epstein, Inc., 38 Elm St., Hartford, Conn.***electrical work, to A. A. MacPherson Co., 426 Platt Ave., West Haven, Conn.***waterproofing, dampproofing, insulation, to Eagle Cornice Co., 314 Blackstone St., Providence***hardware, to Sargent & Co., Water St., New Haven, Conn.***painting, to E. Galusha, P. O. Box 335, Hartford, Conn.***marble, to New Haven Stone Marble & Tile Co., 127 Chapel St., New Haven, Conn.***granite, to E. Bernardo, 15 Murray St., North Providence***iron, to Roanoke Iron Wks., Inc., Roanoke, Va.***structural steel, to New England Iron Wks., 1351 Dixwell Ave., Hamden, Conn.***reinforcing steel, to Truscon Steel Co., 42 Chapel St., New Haven, Conn.***finish, to A. Vincent Pepe & Co., 68 Cottage St., Darby, Conn.***plastering, to Williamsport Plastering Co., Ardsley, Pa. Bids Jan. 30. Noted Feb. 17, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

†**S. D., Lemmon**—Treas. Dpt. at office Sup. Archt., Wash., D. C., constructing U. S. Post Office, to S. W. Johnson & Co., Aberdeen, $57,750. Bids Feb. 26. Noted Jan. 20, C. D.—Jan. 23, E. N.-R.

†**Tex., Dallas** — Treas. Dpt. at office Sup. Archt., Wash., D. C., installing complete elevator plant in parcel post building, to Otis Elevator Co., 810 18th St., Wash., D. C., $53,658. Bids Feb. 28. Noted Mar. 24, C. D.—Feb. 13, E. N.-R.

Vt., Bennington—E. J. Pinney Co., Inc., general contractors, 220 Dwight St., Springfield, Mass., heating for courthouse and jail, to Thomas Horton, North Bennington***plumbing, to G. Pierce, Bennington***roofing and metal work, to A. C. Hathorne Co., South Winooski ***painting, to H. Newton Marshall Co., 522 Harrison Ave., Boston, Mass. **P.W.A.** Noted Feb. 28, C. D.—Mar. 5, E. N.-R., under "Contracts Awarded."

†**Va., Norfolk** — Treas. Dpt. at office Sup. Archt., Wash., D. C., interior changes in U. S. Post Office, to Harrison M. Lucas, 115 Bruce St., Portsmouth, $20,392. Noted Feb. 7, C. D.

Wis., Milwaukee—Bd. School Directors, to Parkman Constr. Co., 2347 North 45th St., fresh air intake at Mound St. School, $4,109 ***to C. Salt Constr. Co., 2045 North 49th St., filter air intake for Palmer School, $1,846; pent house oil room, Washington High School, $1,230***to Lippmann Eng. Wks., 4603 West Michell St., ash elevator for same school, $675 ***to Super Steel Products Co., 325 West McKinley Ave., sheet metal for Solomon Juneau High School, $378***to Frank Dow Paint Co., 929 North 3rd St., turpentine, 52.75c. per gal.; linseed oil, 74.75c. per gal.; and raw oil at 71.75c. per gal.***to Sherwin-Williams Co., 746 North 3rd St., grinding liquid, 73c.; white lead, $7.98 per cwt.; mixing varnish, 66c. Bids Feb. 27. Noted Feb. 21, C. D.

B. C., Esquimalt—Parfitt Bros. Ltd., general contractors, Victoria, painting drill hall, for Dominion Govt., Ottawa, Ont., to Melrose Co. Ltd., 1108 Broad St. Noted Jan. 9, C. D.—Jan. 16, E. N.-R.

COMMERCIAL BUILDINGS

PROPOSED WORK

Calif., Los Angeles—F. D. MacKay, pres. MacKay Business School, 612 South Figueroa St., plans 6 story, 101x156 ft. business college, 612-20 South Figueroa St. $300,000.

Calif., West Los Angeles—Twentieth Century-Fox Film Co., 10,260 Orton Ave., plans completed for 3 story, 90x280 ft., rein.-con. studio building, 10,260 Orton Ave., $250,000. J. A. Barlow, 10,260 Orton Ave., engr. Noted Oct. 17, C.D.—Oct. 24, E.N.-R.

Colo., Colorado Springs—Broadmoor Hotel Co. plans expending $250,000 for outdoor dance floor and cocktail terrace, improvements to other parts of hotel and improvements to zoo and Cheyenne Mountain Shrine.

Colo., Walsenburg — Bain Department Store plans department store and storage. To exceed $150,000. **Maturity indefinite.** Architect not appointed.

Conn., Meriden—St. Mary's Roman Catholic Parish, A. M. Kaicher, pastor, plans brick, stone parochial school, convent, parish house, Grove St., $140,000. Architect not appointed.

La., New Orleans—Marks Isaacs Co., Canol St., plans by Weiss, Dreyfous & Seiferth, Maison Blanche Bldg., remodeling store, $150,000. L. S. Weil, 427 South Peters St., and W. Moses, New Orleans, engrs.

La., New Orleans—Peabody Hotel, Memphis, Tenn., plans by L. S. Weil & W. B. Moses, New Orleans, air conditioning Peabody Hotel, incl. 130 tons refrigerating equipment with all ducts, ventilators, etc. $40,000.

Md., Baltimore—Talmudical Academy, S. A. Needle, 111 North Charles St., plans school on Cottage Ave. $150,000. Architect not appointed.

Miss., Mory—First Methodist Church plans church. Est. about $140,000. Architect not appointed.

N. Y., Belle Harbor—Church, c/o J. L. Patterson, pastor, Beach Blvd., bids in May or later, constructing church, Beach 129th St. $140,000. A. F. Meissner, 89-20 162nd St., Jamaica, archt. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

N. Y., Brooklyn—Artcraft Properties, Inc., 1053 Nostrand Ave., plans by Levy & Berger, 6 story apartment, 1648 East 13th St., $150,000.

N. Y., Brooklyn—Park Home Builders, Inc., H. Dorman, pres., 66 Court St., plans by V. Driesler, Jr., 163 Remsen St., constructing brick dwellings, Avenue S and Stuart St. $140,000.

N. Y., Brooklyn—See "Contracts Awarded."

N. Y., Flushing—See "Contracts Awarded."

N. Y., Flushing—Jaxland Realty Co., 146th St. and North Hempstead Pike, plans by J. Unger, 39-01 Main St., group 2 story, frame dwellings, 156th Rd. and 146th St. $140,000.

N. Y., Jackson Heights—S. Atlas, 413 Avenue A, Brooklyn, plans by S. M. Palm, 159-15 Northern Blvd., Flushing, group 2 story, brick dwellings, 34th Ave. and 71st St. $140,000.

N. Y., Jackson Heights — Garland Realty Corp., c/o Queensboro Corp., 81-20 37th Ave., plans 6 story, brick apartment, 86th St. and 34th Ave. $150,000. Site acquired. Architect not appointed.

N. Y., Laurelton—J. and M. Spevack, Cross Island Blvd. and 131st St., or c/o A. E. Fahr, archt., 90-23 161st St., Jamaica, plans group brick, dwellings, Cross Island Blvd. and 131st St. To exceed $200,000.

N. Y., Little Neck—Corporation, c/o E. D. Litchfield, archt. and engr., 578 Madison Ave., New York, plans constructing residential community, incl. golf club improvement, streets, walks, etc., on 200 acre site, Nassau Co. Line and Little Neck Bay. To exceed $150,000.

N. Y., Long Island City—Skillman Avenue Realty Co., 535 5th Ave., New York, plans by H. I. Feldman, 15 West 44th St., New York, 94x119 ft. apartment, 42nd St. and Skillman Ave. $200,000.

N. Y., Long Island City — Bravdey Realty Corp., 943 50th St., Brooklyn, plans by Wuest & Bailey, 32-03 30th Ave., group 4 story, tenements, 28th Ave. and 33rd St. Est. about $140,000.

N. Y., New York—Emigrant Industrial Savings Bank, 51 Chambers St., New York, altering heating, plumbing, elevator in store and office, 1418 Bway. $40,000. Voorhees, Gmelin & Walker, 101 Park Ave., archts.

N. Y., New York—Essen Holding Corp., 420 Lexington Ave., plans by D. S. Lang, 206 Bway., altering, heating, plumbing, electrical work in 5 story apartment, 1 West 117th St. $40,000.

N. Y., New York—Gefree Realty Corp., 17 East 42nd St., c/o P. Wellins, plans 6 story, 102x175 ft. apartment, 310 East 75th St. $150,000. Site acquired.

N. Y., New York—Hotel Astor, Bway. and 44th St., plans by W. M. Ballard Co., engrs. and archts., 347 Madison Ave., air conditioning 750 hotel rooms, Bway. and 44th St. To exceed $100,000.

N. Y., New York—Jacob Rupert Realty Co., 1639 3rd Ave., plans by F. S. Parker, 533 West 57th St., altering heating, plumbing, mechanical equipment in 20 story office and store building, 110 East 24th St. $60,000.

N. Y., New York — La Salle Academy, c/o Roman Catholic Church of Nativity, 44 East 2nd St., plans by J. W. O'Connor, 162 East 37th St., constructing two 5 story, school, 44 East 2nd St. $225,000.

N. Y., New York—Mutual Life Insurance Co., 32 Nassau St., plans by D. E. McElroy, c/o owner, altering heating, plumbing in 5 story store and apartment, 198 8th Ave. $40,000.

N. Y., New York—Realty Holding Co., 136 East 57th St., will not alter elevator and heating in five 7 story apartments, 323 West 34th St. Project abandoned. Noted Dec. 9, C. D.—Nov. 21, E. N.-R.

N. Y., New York—Two Park Avenue Building, Inc., 2 Park Ave., sketches by E. J. Kahn, 2 Park Ave., altering heating, plumbing in 25 story, office and school, 2 Park Ave. $70,000.

N. Y., New York—Yates Park Realty Corp., 840 Brady Ave., plans by I. J. Berger, c/o owner, group 2 story, dwellings, Morris Park and Yates Aves. $140,000.

N. Y., New York—Zehngebot Bros., 106 Fort Washington Ave., plans by Miller & Goldhammer, 40 East 49th St., 6 story, brick apartments, Shakespeare Ave. and 170th St. $200,000.

N. Y., Niagara Falls—Calvary Evangelical Lutheran Church plans constructing church. Architect not appointed.

N. Y., Poughkeepsie—Allen, Collins & ... archts., 75 Newbury St., Boston, Mass., ... contract constructing library for Vassar ... Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

N. Y., Springfield—Franksons Realty ... 140-08 171st St., plans by L. Damancho, ... Jamaica Ave., Jamaica, group 2 story ... 140th Ave. and 173rd St. $140,000.

N. Y., Syracuse—New York State R... Union Depot, Utica, plans constructing ... office building. Architect and engineer ... pointed.

N. Y., Yonkers — Certified Home ... Yonkers, plans constructing 50 residen... ball Terrace. $350,000. Private plans. Maturity **in spring.**

O., Cincinnati—H. H. Gott, Jr., 6364 Montgomery Rd., plans group 2 story dwellings, Section Rd. $140,000.

O., Cincinnati—Holscher & Rape, 3870 Isabella Ave., plans group of 150 dwellings to exceed $200,000. Private plans.

Va., Winchester—F. L. Glaize, Sr., and Shirley Carter, Winchester, plan constructing apartment. Est. about $140,000. **Maturity indefinite.** Architect not appointed.

W. Va., Welch—S. Polan plans 4 ... story apartment and store. Est. about $140,000. **Maturity indefinite.** Architect ... pointed.

★ **Ont., Ottawa** — Owner, c/o Burgess & Howood, archts., Queen St., plans constructing 70 houses and other building in ... velopment known as Slattery Subdivision, $500,000.

★ **B. C., Vancouver**—Y.M.C.A., A. S. Mather, secy., plans by J. Y. McCarter, Marine Bldg., constructing building. $500,000.

Que., Joliette—Reverend Clerics of St Viateur plans constructing addition to ... $300,000.

BIDS ASKED

N. Y., Brooklyn—Chestnut Studio Corp., 321 West 44th St., New York, bids about May 1 or later, construction motion picture ... 1262 East 14th St. $300,000. T. W. Golding, 14 West 40th St., New York, archt. Noted Feb. 6, C. D.—Feb. 13, E. N.-R.

N. Y., Forest Hills—See "Contracts Awarded."

N. Y., Jamaica—See "Contracts Awarded."

N. Y., New York—See "Contracts Awarded."

N. Y., St. Albans—See "Contracts Awarded."

CONTRACTS AWARDED

Ind., Notre Dame—Notre Dame University, Rev. Father J. F. O'Hara, pres., general contract 3 story, basement dormitory, to Schmitt & Sons Constr. Co., 518 East Sample St., South Bend, on cost plus basis. Est. $300,000. Maginnis & Walsh, Statler Bldg., Boston, Mass., archts.

Mo., Festus—M. J. Lawlor, general contractor, 5632 Terry Ave., St. Louis, reinforcing work for 3 story, basement, 32x80 ft., 40x86 ft. and 40-101 ft. novitiate building for Ursuline Sisters, Sappington Rd., Kirkwood, to F. Schirra Sons Co., 4336 College St., St. Louis***brick work to F. Daues, 3453 Gasconade St., St. Louis***plumbing, to A. E. Dullon Co., 5433 Gilmore St., St. Louis***heating, to T. J. Sullivan Heating Co., 2734 Olive St., St. Louis. Noted Jan. 6, C. D.—Jan. 9, E. N.-R., under "Contracts Awarded."

N. J., Belleville—St. Peters Roman Catholic Church, William St., constructing 2 story basement, 60x176 ft. 13 classroom school, William St., to E. M. Waldron, Inc., 40 Park Pl., Newark, $100,000***heating, to F. P. Farvull, 203 Camden St., Newark, $7,600***plumbing, to A. R. Gasewind Co., 1060 Broad St., Newark, $5,000. Grand total $112,600. Electrical work to Badaracco Bros., 405 Washington St., Hoboken. Noted Jan. 29, C. D.—Feb. 6, E. N.-R.

N. Y., Brooklyn—**F. and J. Land Co.**, 3217 Bedford Ave., 6 story, brick apartment, site found., West 13th St. and Avenue P, separate contracts now being awarded. $250,000. Cohen Bros., 191 Joralemon St., archt. Noted Feb. 7, C. D.—Feb. 13, E. N.-R.

N. Y., Brooklyn—J. Kaiser, 2053 82nd St., plans by J. Lubroth, 26 Court St., group frame brick dwellings, 6103 82nd St., separate contracts, $150,000. J. Lubroth, 26 Court St., archt. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

N. Y., Flushing—Tru Homes, Inc., 164-18 Jamaica Ave., Jamaica, group dwellings, 164-01 Ave. and 87th St., day labor. To exceed $140,000. Will purchase materials. D. J. Levinson, 161-02 84th Dr., Jamaica, archt. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

N. Y., Flushing—Supro Homes, Inc., 129-08 97th Ave., Richmond Hill, constructing group frame dwellings, Main St. and 61st Rd., separate contracts now being awarded. $140,000. D. J. Levinson, 161-02 84th Dr., Jamaica, archt. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

N. Y., Forest Hills—Allenjoan Realty Co., Tennis Pl., Forest Hills, constructing group 2 story, brick, dwellings, Tennis Pl. near Ext. 84th St., separate contracts. $140,000. C. C. Rogers, c/o owners, archt. Noted Feb. 18, C. D.—Feb. 20, E. N.-R.

N. Y., Jamaica—Pineford Realty Corp., 38-17 Bell Ave., Bayside, constructing group 2 story frame dwellings, Surrey Rd. near Kildare Ave., by day labor and separate contracts. $140,000.

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†*Federal Government*

Commercial Buildings (Continued)

J. Unger, 39-01 Main St., Flushing, archt. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., New York—Bijou Corp., M. Rosenfeld, pres., Riverdale-on-Hudson, constructing 6 story apartment, 232nd St. and Riverdale Ave., separate contracts. $350,000. Private plans. Noted Feb. 3, C. D.—Feb. 6, E. N.-R.

N. Y., New York—New York State Realty Terminal Corp., 466 Lexington Ave., air conditioning system in 12 story apartment, 400 Park Ave., to Delco Frigidaire Conditioning Co., 224 West 57th St., est. exceeds $40,000.

N. Y., New York—Rismar Realty Co., Inc., 110 East 42nd St., 6 story, brick apartment, plain found., Grand Concourse near 197th St., separate contracts. $140,000. I. Margon, 110 East 42nd St., archt. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

N. Y., New York—Two Thousand Ninety-One Realty Corp., 349 East 149th St., constructing 6 story, brick apartment, plain found., 182nd St. and Grand Concourse, separate contracts now being awarded. $200,000. H. Ginsbern, 205 East 42nd St., archt. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., New York—Valentine Equities, Inc., 1115 East 177th St., 6 story, brick apartment, plain found., Valentine Ave. near 184th St., separate contracts now being awarded. $150,000. J. M. Felson, 250 West 57th St., archt. Noted Feb. 13, C. D.—Feb. 20, E. N.-R.

N. Y., St. Albans—L. Levy, Linden Blvd., group 100 steel, brick, dwellings, Linden Blvd., by separate contracts now being awarded. $150,000. Private plans.

N. Y., St. Albans—J. Newman Corp., 115th Rd. and 22nd St., constructing group 1 story, 25x42 ft. frame dwellings, 220th St. and 115th Rd., day labor and separate contracts. $140,000. J. E. Cahill, 89-64 163rd St., Jamaica, archt. Noted Feb. 17, C. D.—Feb. 20, E. N.-R.

N. Y., St. Albans—Southern State Parkway Homes, Inc., 225th St. and Foch Blvd., constructing group frame dwellings, 225th St. and 116th Ave., day labor and separate contracts. $140,000. W. Sambur, 162-02 Jamaica Ave., Jamaica, archt. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

O., Cleveland—Great Lakes Exposition Co., A. N. Consoir, ch. engr., constructing 1 story, 181x502 ft., steel, presswood automotive building for temporary use, to Hunkin-Conkey Constr. Co., 1740 East 12th St., est. $150,000***3 story, 60x200 ft. horticultural building temporary exhibition purpose, to Lundoff-Bicknell Co., Terminal Tower, est. $200,000. Noted Mar. 3, C. D.

O., Cleveland—Great Lakes Exposition Co., A. N. Gonsoir, ch. engr., 3 story, basement, 200x500 ft., steel wallboard, sheet metal Hall of Progress building, on Lake Front, to Hunkin-Conkey Constr. Co., 1740 East 125th St. Est. $125,000. A. J. Thornin, 1906 Terminal Tower, archt. Bids Mar. 5. Noted Mar. 3, C. D.

O., Granville—Denison University, general contract constructing library on campus, to Skinner, Cook & Babcock, 60 East 42nd St., New York, $350,000. Contractor soon lets separate contracts. Noted Feb. 20, C. D., under "Public Buildings."

Ore., Portland—Montgomery Ward Co., West Chicago Ave. and North Larrimore St., Chicago, Ill., electrical work for 9 story mail order house addition, to Jaggar-Stoufe Co., 412 Southwest 10th St.; heating, to Urban & Sinnot Plumbing & Heating Co., Portland. Est. about $100,000. Noted Feb. 17, C. D.—Feb. 20, E. N.-R., under "Contracts Awarded."

INDUSTRIAL BUILDINGS

PROPOSED WORK

Ala., Birmingham—PLANT—Texas Co., 135 East 42nd St., New York, plans repairing distribution and storage plant damaged by fire, $50,000. Private plans.

Calif., Duarte—PACKING PLANT—Duarte Foothill Citrus Assn., east of here, plans by R. M. Finlayson, 108 East Colorado Blvd., Monrovia St., new packing plant, on Fish Canyon Rd. $55,000.

Calif., Los Angeles—WAREHOUSE, etc.—Flower Realty Co., 420 West 11th St., plans by Abbott, Merkt & Co., 22 East 40th St., New York, and E. T. Heitschmidt, 807 Subway Terminal Bldg., and soon takes bids general contract 3 story, basement, 150x247 ft., reinforced concrete, commercial warehouse, garage, etc., 1130 South Flower St. $200,000. United Parcel Service, 420 West 11th St., lessee.

Conn., Bridgeport—SERVICE STATION—International Harvester Co. of America, 320 North Ave., plans brick, steel motor truck service station, Fairfield Ave. $50,000-$600,000. Private plans.

Conn., Waterbury — PLANT — Connecticut Lumber Co., Inc., 1500 Highland Ave., C. Tremaghio, pres., plans rebuilding 3 units of plant, 2 story, basement, recently destroyed by fire, Highland Ave., incl. woodworking equipment, cement mixers and drying kiln. To exceed $37,000. Private plans.

Del., Wilmington—BOILER PLANT—Ludlow Mfg. Associates, Ludlow, Mass., soon lets contract constructing 1 story, 74x74 ft., brick, steel boiler plant, $37,000 with equipment. C. T. Main, Inc., 201 Devonshire St., Boston, Mass., archts.

D. C., Wash.—LUMBER YARDS, etc.—Gallihar & Klimkiewez, 1334 11th St. S.E., plans constructing lumber yards and storage. To exceed $50,000. Architect not appointed. **Maturity indefinite.**

Ill., Batavia—PLANT—Campana Corp. bids in May constructing 2 story office, and 1 story fireproof factory buildings, plain found., on 4 acre site on Lincoln Hy., $400,000. F. D. Chase, Inc., 307 North Michigan Ave., archts. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

Ind., Anderson—CANNING PLANT—Stokeley Bros. & Co., 1301 West Main St., Louisville, Ky., plans altering canning plant, and plans purchasing $25,000 worth of machinery to be installed in same, on West 22nd St. Total $40,000.

Ind., Bedford — MILL — Indiana Limestone, Inc., plans repairing or rebuilding Donnelly Mill. Est. about $40,000. **Maturity indefinite.** Architect not appointed.

Ind., Fort Wayne—PLANT—Truck Eng. Co., Fort Wayne, soon lets contract plant addition. $45,000.

Ind., Indianapolis—STORAGE—Liberty Electric Co., 34 West North St., plans storage, distribution and shop. Est. about $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

Md., Baltimore—PLANT REPAIRS, etc.—Western Maryland Mill & Lumber Co., 2636 West North Ave., plans repairs and alterations to storage plant and yards, 2636 West North Ave. To exceed $37,000. Architect not appointed.

Md., Lorelei—WAREHOUSE—Wright Distillery Co., Redwood and Lights Sts., Baltimore, soon lets contract 5 story, brick, frame rack warehouse. $75,000. Private plans.

Md., Salisbury—DISTILLERY—C. W. Gall making plans two 1 story and one 2 story distillery buildings. $75,000. Private plans.

Mich., Detroit—STOVE FACTORY—Smith, Hinchman & Grylls, archts. and engrs., Marquette Bldg., Detroit, soon lets contract 1 and 2 story, 70x300 ft., brick, reinforced, steel stove factory, plain found., Kercheval Ave., for Detroit Vapor Stove Co., Kercheval and Connors Aves. $45,000.

Minn., Oliva—GRAIN ELEVATOR—Osborne & McMillan Elevator Co. plans grain elevator. Est. about $37,000 with equipment. **Maturity indefinite.** Architect not appointed.

Mo., St. Joseph—POWER PLANT—St. Joseph Ry. Light & Power Co. plans constructing steam electric power plant addition. $450,000 with equipment.

Mo., St. Louis—TIN FOIL FACTORY—Johnston Tin Foil & Metal Co., 6008 South Bway., soon lets contract 2 story, 102x117 ft., reinforced con., brick tin foil factory, Bway. and Bowen St. O'Meara & Hills, G. E. Quick, Associate, 5709 Waterman Ave., archts.

N. J., Newark—BREWERY—Hoffman Beverage Co., 402 Grove St., soon lets contract 4 story, reinforced con., steel brewery addition, Grove St. $30,000, equipment $50,000. Total $80,000. Epple & Kahrs, 15 Washington St., archts.

N. Y., Albany—PLANT—A.P.W. Paper Co., 1273 Bway., rejected bids Feb. 11, constructing Storage Building E, North Albany Plant. Johnson & Wierk, Grand Central Terminal, New York, archts. Will release new bids about Apr. 1. Noted Feb. 4, C. D.—Feb. 6, E. N.-R.

N. Y., Buffalo—BOILER HOUSE—Air Reduction Sales Co., 730 Grant St., Buffalo, J. R. Wolf, in charge, soon takes bids constructing boiler house, 730 Grant St. Est. about $37,000. Private plans.

N. Y., Buffalo—WAREHOUSE—F. H. Loehr, 2660 Seneca St., soon takes bids reconstructing warehouse.

N. Y., Corning—FACTORY—Corning Glass Wks., Walnut St., soon takes bids on revised plans constructing 5 story, 60x165x400 ft., brick, glass block, steel packing, assemblying building addition, plain found., Walnut St. $350,000. Private plans. Noted Dec. 31, C. D.—Jan. 9, E. N.-R.

N. Y., New York — GARAGE, etc. — Blyte Super-Service Auto Corp., 51 Madison Ave., plans by D. S. Lang, 206 Bway., altering 3 story garage and shop, 143 East 24th St. $37,000 with equipment.

N. Y., New York—BUS TERMINAL—Cinema Realty & Leasing Co., 551 5th Ave., plans by E. DeRose, 105 West 40th St., 1 story bus terminal, Jerome Ave. and 170th St. Est. about $40,000.

N. Y., New York—FACTORY—R. E. Dietz & Co., 60 Laight St., plans by W. B. Higginson, 101 Park Ave., altering factory for manufacture of lanterns, 60 Laight St. $125,000.

N. Y., New York — FACTORY, etc. — Five Hundred Forty-Four Madison Avenue Corp., 70 Bway., plans by Schwartz & Gross, 347 5th Ave., 2 story, 68x95 ft., brick factory and loft building, plain found., 554 Madison Ave. $75,000.

N. Y., New York—STORAGE, etc.—One Hundred Thirty-Seven East 57th Street Corp., B. S. Weil, pres., 137 East 57th St., plans by Taylor Constr. Co., 31 Union Sq., 2 story, storage and showroom, 133 East 57th St. $40,000.

N. Y., Niagara Falls—FURNACE BUILDING—Titanium Alloy Mfg. Co., Hyde Park Blvd. and Lafayette Ave., soon takes bids general contract constructing furnace building. Private plans.

N. Y., Ozone Park—GARAGE and SERVICE STATION—C. Bauman, 87-02 Atlantic Ave., Ozone Park, plans by H. Eidt, c/o owner, 2 story, brick, garage and service station, 87th St. and Atlantic Ave. Owner will purchase several 1,000 gal. underground gasoline tanks, pumps, etc.

N. Y., Ozone Park—STORAGE WAREHOUSE—Adelphi Paint & Color Wks., 86th St. and Old South Rd., plans by M. Kampe, c/o owner, 1 story storage warehouse, Dumont Ave. and 84th St. Est. about $37,000 with equipment.

N. Y., Troy—FACTORY—Burden Iron Co., Troy, plans enlarging factory for manufacturing articles from light alloys and stainless steel. To exceed $37,000. Private plans. A. Musso, East Orange, N. J., and Troy, will purchase machinery.

O., Barnesville — BAKERY — McClelland-Kennard Baking Co. plans bakery. $50,000.

O., Cleveland—SERVICE STATIONS, etc.—Tank Car Stations Inc., c/o E. Johnston, 3610 Delaware Ave., Buffalo, N. Y., plans service stations and repair shops at Bway and Central Ave. and 3958 Superior Ave. Est. about $37,000 with equipment. L. J. Weiskopf, 2704 Mayfield St., archt. and engr.

O., Lynchburg—DISTILLERY—Frieberg & Workum Distillery, c/o J. L. Bennett, Decatur, Ill., plans distillery reconditioning. $100,000.

O., Youngstown — FACTORY — Cold Metal Process Co. (mfgrs. rolling mills for steel plants), V. J. Lamb, pres., plans new modern factory. To exceed $100,000. $500,000 loss caused by fire.

O., Youngstown — SERVICE — Ohio Edison Co., 25 East Boardman St., plans brick, steel, concrete service building, $250,000.

★ **Pa., Bellefonte** — LIME KILN — Chemical Lime Co., T. M. Brown, pres., plans constructing modern lime kiln and opening up new limestone mine on owners property, in Buffalo Run Valley. Will purchase transmission and conveying equipment and other machinery and equipment. **Maturity at once.** Company received $500,000 loan from R.F.C. to make above improvements.

Pa., Durant City—PLANT—P. G. Sullivan, atty., 1st Natl. Bldg., Pittsburgh, Pa., acting for group connected with Continental Glass Mfg. Co., The Hague, Holland, purchased at sheriff's sale former $4,000,000 glass manufacturing plant of Durant Motor Car Co. at Durant City. Company making survey for rehabilitation and improvements for manufacturing plate, safety glass and special glass products. To exceed $37,000.

R. I., North Smithfield — PLANT — Branch River Wool Combing Co., Inc., North Smithfield, soon lets contract general contract 1 story, basement, 85x355 ft., brick wool combing plant addition. $125,000. Bids Mar. 18, for heating and electrical work. Lockwood Greene, Inc., 40 Central St., Boston, Mass., archts.

★ **Washington** — PLYWOOD PLANT — A. R. Wuest, 303 West 9th St., Aberdeen, financing completed for plywood plant in Aberdeen, Hoquiam or Cosmopolis. $500,000. Work completed this summer. Engineer not retained.

Wis., Elcho—FURNITURE FACTORY—Elcho Corp. plans altering and repairing furniture factory. To exceed $40,000. Architect not appointed.

Wis., Kaukauna—PLANT—Thilmany Pulp & Paper Co. Kaukauna, plans plant addition. $50,000.

Wis., Milwaukee — GRAIN ELEVATOR — Froedert Grain & Malt Co., South 38th and West Grant Sts., plans 1,500,000 bu. capacity reinforced con. grain elevator, West Grant St. $350,000. Burrell Eng. & Constr. Co., 400 West Madison St., Chicago, Ill., engrs.

Wis., Milwaukee—MANUFACTURING—Milwaukee Goodwill Industries, 900 South 5th St., plans 5 story, basement, 50x80 ft., reinforced con., brick manufacturing storage building, plain found., South 4th St. C. Whitney, 724 East Mason St., engr.

Wis., Wausau — GRANITE PLANT — Lake Wausau Granite Co. plans by Oppenheimer & Obel, Wausau, 1 story, 40x260 ft. granite plant, brick, steel, stone found.

Canada—CANNERIES—Empire Foods Corp., J. Wall, pres., Victoria Ave., Tecumseh, Ont., plans improvements to buildings and new equipment for 10 canneries in various parts of Canada. $200,000.

Alta., Edmonton—PLANT—North Star Oil Co., 801 McLeod Bldg., J. H. McArthur, mgr., plans constructing and equipping oil storage plant, 105th Ave. $45,000.

Alta., Lethbridge—POWER HOUSE—Royal View Coal Mines Ltd., plans reconstructing power house, compressors and hoists.

★ **Alta., North Edmonton**—PLANT—Canada Packers Ltd., Edmonton, plans packing plant. $1,000,000.

B. C., Giscombe — PLANT — Upper Fraser Spruce Mills Ltd., plans constructing plant and will also purchase equipment. $50,000.

B. C., Gold Bridge—ASSAY BUILDING—Wayside Consolidated Gold Mines Ltd., plans constructing assay building and will purchase all equipment.

B. C., Ladysmith—LUMBER MILL—Mayo Lumber Co., Duncan, plans constructing new wood saw mill to cut 40,000 per day, plain found., Waterfront. $40,000. Engineer and Architect not appointed.

B. C., Penticton—MINING DEVELOPMENT—Wallace Mountains Mining Co. Ltd., plans mining development during 1936. $100,000.

Ont., Ashawa—COKE PLANT—Grant Eng. Co. Ltd., 1164 Beaver Hall Hill, Montreal, Que., J. H. Purkess, secy., soon takes bids constructing coke manufacturing plant. Est. about $50,000

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Industrial Buildings (Continued)

Ont., Chatham—PLANT—Libby, McNeill & Libby of Canada, 330 Richmond St., constructing 2 story, 80x80 ft., rein.-con. addition to processing plant. J. Methven, 92½ King St. W., archt.

Ont., Kirkland Lake—MINING PLANT—Kirkland Rand Mines Ltd., S. Gershin, mgr., soon takes bids constructing new mining plant. $50,000.

Que., Three Rivers—PAPER MILL—Canadian International Paper Co. Ltd., soon takes bids constructing extension to plant. $400,000. S. K. LeBaron, 102 St. Maurice St., engr.

BIDS ASKED

N. Y., Jamaica—STORAGE, etc.—New York Plumbing Specialties Co., 148-14 Liberty Ave., taking bids general contract storage, showroom and shop, Liberty Ave. and Grunsberg Pl. $37,000. L. Danancher, 147-25 Jamaica Ave., archt. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., New York—STORAGE—See "Contracts Awarded."

O., Warren—TIN MILL etc.—See "Contracts Awarded."

O., Youngstown — TUBE MILL — See "Contracts Awarded."

Tenn., Niota—HOSIERY MILLS—See "Contracts Awarded."

Utah, Salt Lake City—WAREHOUSE, etc.—International Harvester Co., 606 South Michigan Ave., Chicago, Ill., taking bids (from selected list of bidders), 4 story warehouse and office building. To exceed $100,000.

Ont., Goward — SMELTER — J. C. Krumm, engr., 515 Harbor Comm. Bldg., Toronto, taking bids 1 story, steel, corrugated iron building, for Cuniptan Mines Ltd., 301 Dominion Bldg., 465 Bay St., Toronto. $100,000.

Ont., Hamilton—FACTORY—C. J. Muncie, 1015 Waterloo St., London, taking bids for mechanical trades for 1-2 story, basement, 121x471 ft., brick, steel, plain found., Cavell Ave., for Kraft Containers Ltd., c/o President, 47 Duke St. $100,000.

★ **Ont., Sault Ste. Marie**—PLANT—Algoma Steel Corp. bids about May 1, constructing plant for manufacture of hot and cold flat steel products. To exceed $500,000. Noted Oct. 7, C. D.—Oct. 10, E. N.-R.

CONTRACTS AWARDED

Calif., Palo Alto—GARAGE and SERVICE—J. S. Stephens, Jr., 550 Melville Ave., 1 story, 105x115 ft., rein.-con. garage and service building, Forest Ave., to W. P. Goodenough, 569 Lowell Ave., fixed fee basis. B. Clark, 310 University Ave., archt.

Calif., Watsonville — PACKING PLANT — Pajaro Cold Storage Co., Watsonville Junction, Watsonville, general contract lettuce packing plant, Watsonville Junction, to T. H. Rosewall, Watsonville, about $40,000. General contractor awarded mechanical equipment contract to Link-Belt Co., Paul Ave., San Francisco***plumbing, to P. J. Freiermuth Co., Watsonville***electrical work, to Just-Rite Electric Co. & P. V. Electric Co., Watsonville***motors, to Meade Motor Co., Salinas. A. W. Story, Valley Natl. Bank Bldg., archt.

Conn., Ansonia—FACTORY—H. Wales Lines Co., general contractors, 134 State St., Meriden, structural steel, also erecting for brick and steel factory addition and alterations, to Berlin Constr. Co., Berlin, for S. O. C. Co., 520 Main St.***waterproofing, dampproofing, to G. R. Cummings Roofing Co., 198 State St., Meriden ***painting, to Arthur Wilkes, 370 Laurel Ave., Bridgeport. Noted Mar. 6, C. D.—Mar. 12, E. N.-R., under "Contracts Awarded."

Conn., Bridgeport—FACTORY—Hemeb Moulding Div., Bryant Electric Co., H. E. Seim, genl. mgr., 1421 State St., general contract 1 story, 30x40 ft. and 90x200 ft. factory addition, Railroad Ave., to Edwin Moss & Sons, Union Ave., $80,000. Bids Mar. 4. Noted Jan. 22, C. D.—Jan. 30, E. N.-R.

Conn., Bridgeport — FACTORY — E. and F. Constr. Co., general contractors, 94 Wells St., reinforcing steel for 1 story, 87x111 ft., brick, stone, rein.-con. factory addition, to Bethlehem Steel Co., 8th and Lehigh Sts., Bethlehem, Pa., for Braunworth & Co., 60 Main St.***roofing, sheet metal, to Barrett Roofing & Supply Co., 1696 Stratford Ave.***painting, to A. Wilkes, 163 Sherwood Ave.***plumbing, to Berger & Graether, Pequonnock and Maplewood Sts. Noted Feb. 21, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Conn., Hartford—WAREHOUSE—G. Cudemo, Inc., general contractors, 983 Main St., electrical work for 1 story, basement, 65x75 ft. and 65x105 ft., brick, steel, concrete cold storage warehouse, Conn. Blvd. and Kilbourne Sts., to Freedman Electric Co., 639 Albany Ave. for Pioneer Fruit & Commission Co., 103 Connecticut Blvd. ***cast stone, to Dextone Co., 166 Chapel St., New Haven***partitions, kalamein doors, to L. R. Smith, 108 Whitman Ave., West Hartford***trim, to Hartford Builders Finish Co., 34 Potter St., West Hartford***excavating, to E. B. McGurk, Inc., 1300 Albany Ave.***reinforcing steel, steel pans, windows, to Scherer Steel Co., 151 Ballard Drive, West Hartford (agent); painting, to Light & Addis Co., Colton St., Windsor***structural steel and iron, to National Steel Products Co., 3250 Main St., Hartford***roofing, sheet metal, to Hartford Roofing & Sheet Metal Co., 51 Fairmount St. Noted Feb. 25, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Conn., New Haven—WAREHOUSE—P. Ballantine & Co., Inc., Newark, N. J., general contract 1 story, 62x151 ft., brick, steel, concrete beer distributing warehouse, to Turner Constr. Co., 420 Lexington Ave., New York. Est. $40,000. Noted Mar. 11, C. D.

Ga., Vienna—PACKING PLANT—White Packing Co. repairing packing plant damaged by fire, to J. E. Hampton, Vienna. Est. about $37,000 with equipment.

Md., Owings Mills—DISTILLERY—Owings Mills Distillery, reconditioning distillery, to Walter Tovell, Inc., Eutaw and Monument Sts., Baltimore. Est. $65,000.

Mass., Dartmouth—DAIRY—Braley's Creamery, Inc., 3 Pleasant St., Fairhaven, Mass., heating for 1 story, basement, 106x106 ft. creamery, to Anderson & Olsen, 147 Chancery St., New Bedford***plumbing, to E. Margeson, 1651 Purchase St., New Bedford***electrical work, to Brown Electric Co., 738 Pleasant St., New Bedford. Noted Mar. 6, C. D.—Mar. 5, E. N.-R.

Mass., Salem—FACTORY—Leslie R. Porter Co., general contractors, 156 Stuart St., Boston, reinforcing steel for 1 story, 82x308 ft. and 62x118 ft., brick, steel factory units, Loring Ave., for Hygrade Sylvania Corp., 60 Boston St., Salem, to Truscon Steel Co., 56 Chauncy St., Boston; structural steel, to New England Structural Steel Co., 310 2nd St., Everett. Noted Feb. 20, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

Mich., Grand Haven—PLANT—Petroleum Chemical Co., Detroit, and c/o G. J. Wagner & Co., Grand Rapids, engrs., constructing 1 story, brick, steel, concrete petroleum products plant building, plain found., to Hurley Bros., Tulsa, Okla. Est. $300,000.

Mich., Grand Rapids—PLANT—Leonard Refrigerator Co., plant addition, to Barnes Bros., Grand Rapids. Est. $45,000. Noted Nov. 14, C. D.—Nov. 21, E. N.-R.

Mich., Marysville—PLANT—Chrysler Corp., 341 Massachusetts Ave., Detroit, constructing plant addition, to Walbridge Aldinger Co., 409 Griswold St., Detroit. Est. $50,000. Noted Sept. 4, C. D.—Sept. 12, E. N.-R.

Mich., West Branch—REFINERY—Producers' Refining, Inc., C. J. Westlund, pres., general contract supervision for constructing crude oil refinery, to R. J. Miller Petroleum Eng. Co., 20 North Wacker Dr., Chicago, Ill. Est. $100,000. Noted Feb. 20, C. D.—Feb. 27, E. N.-R., under "Contracts Awarded."

★ **Minn., Shakopee**—GRAIN ELEVATOR, etc. Cepro, Inc., c/o T. J. Elligott, mgr., 2836 11th Ave. S., Minneapolis, general contract 7 story, 160x210 ft. grain elevator and malting plant, rein.-con., brick, to McKenzie Hazine Co., 422 Corn Exch. Bldg., Minneapolis. Est. $700,000.

Mo., St. Louis—CHEMICAL PLANT—Monsanto Chemical Co., 1700 South 2nd St., general contract 3 story, basement, 61x120 ft. special products building for chemical plant, 1723 DeKalb St., to Fruin Colnon Contg. Co., 502 Merchants-Laclede Bldg.

N. J., Jersey City—PLANT—U. S. Gypsum Co., lessee, 300 West Adams St., Chicago, Ill., reconditioning former National Asbestos Co. plant, separate contracts awarded. To exceed $37,000. Noted Mar. 4, C. D.—Mar. 12, E. N.-R.

N. J., Newark—WAREHOUSE—B. Ballantine Co., Inc., 57 Freeman St., constructing storage warehouse, Freeman St., to Turner Constr. Co., 420 Lexington Ave., New York. $75,000. Awarded Mar. 4. J. S. Shanley, 33 Washington St., archt.

N. Y., Brooklyn—FACTORY—Leviton Mfg. Co., 238 Greenpoint Ave., altering factory, 256 Greenpoint Ave., separate contracts. $100,000. G. Erda, archt., 788 Manhattan Ave., will take bids after Apr. 1, on separate contracts. Noted Feb. 14, C. D.—Feb. 20, E. N.-R.

N. Y., Elmira—WAREHOUSE—Ontario Biscuit Co., 805 Hatch St., Elmira, general contract plumbing, heating and air conditioning warehouse, 622 State St., to H. W. Streeter Corp., 508 Wellles St. Est. exceeds $37,000. D. G. Fudge, 351 College Ave., archt.

N. Y., Forest Hills—FACTORY—Rosemont Impvts. Corp., 295 Madison Ave., New York, 5 story, brick, concrete factory, Grand Central Parkway and 64th Rd., separate contracts. $250,000. **Maturity June 1 or later.** Dwight James Baum, Waldo Ave. and 244th St., New York, archt. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., New York—STORAGE—Ella Mellick, 621 MacDonough St., Brooklyn, altering 5 story storage, 196 Greenwich St., separate contracts. Est. about $37,000. J. F. Costa, 202 Greenwich St., is taking general and separate contract bids. C. H. Richter, 175 5th Ave., archt. Noted Feb. 11, C. D.—Feb. 20, E. N.-R.

N. Y., New York—STORAGE, etc.—Public National Bank & Trust Co., 76 William St., constructing storage and showroom, 89 Delancy St., to Rheinstein Constr. Co., 21 East 40th St. Est. $45,000. Noted Feb. 25, C. D.—Feb. 27, E. N.-R.

N. Y., Niagara Falls — FACTORY — Niacet Chemical Corp., Pine Ave. and 47th St., general contract chemical manufacturing building, to Laur & Mack Contg. Co., 1400 College Ave., structural steel, to R. S. McMannus Steel Constr. Co., 1254 East Ferry St., Buffalo. Private plans.

N. Y., Niagara Falls—PLANT—Vanadium Corp. of America, Saunders St. and Settlement Rd., general contract plant addition, to W. S. Johnson Building Co., 2532 Hyde Park Blvd. Est. $85,000.

N. Y., Port Ivory — PLANT — Procter & Gamble, Port Ivory, constructing plant addition, separate contracts awarded. $40,000.

N. C., Lumberton—PLANT—Lumberton Investment Co., constructing redrying plant, boiler room and storage room for tobacco warehouses, to J. E. Kinerly, Winston-Salem, approximately $50,000. Diebrell Bros., Danville, Va., E. B. Ficklen, Greensboro, N. C., and Piedmont Leaf Tobacco Co., Winston-Salem, N. C., lessees. Noted Jan. 16, C. D.—Jan. 23, E. N.-R.

N. C., Tarboro—PLANT—Hart Cotton Mills, constructing plant, separate contracts awarded: 150 tons structural steel, to Richmond Structural Steel Co., 17th and Dock Sts., Richmond, Va. Est. exceeds $40,000.

O., Blue Pigeon—REFINERY—H. A. Montgomery Co., 17191 Swift Ave., Detroit, Mich., crude oil refinery, day labor and separate contracts awarded. $250,000. Russell Carruthers, Findlay, ch. engr.

O., Cincinnati—PLANT—Lockwood Mfg. Co., 3170 Wasson Rd., constructing plant, to Perry Concrete Constr. Co., 203 West 3rd St. Est. $50,000. J. H. Deeken, 800 Bway., archt.

★ **O., Cleveland**—BLAST FURNACE—Republic Steel Corp., R. J. Wysor, vice-pres.-genl. mgr., Republic Bldg., rebuilding blast furnace, constructing docks and general repairs to Corrigan-McKinney plant, direct labor and buys materials. $1,300,000. C. A. Thayer, Republic Bldg., ch. engr.

O., Columbus — DAIRY — Isaly Dairy Co., North High St., dairy products plant, to Heckart Constr. Co., 17 South High St. Est. $150,000. Separate contracts awarded. Noted Jan. 6, C. D.—Jan. 9, E. N.-R.

O., Dayton—POWER PLANT—Dayton Power & Light Co., F. M. Tait, Pres., 20 South Jefferson St., constructing 100x104 ft. power plant, installing 42,000 hp. turbo-generator, two 375,000 boilers, Millers Ford Plant, to United Engineers & Constructors, Inc., 1401 Arch St., Phila., Pa. $250,000. Noted Jan. 3, C. D.—Jan. 9, E. N.-R.

O., Warren—TIN MILL etc.—Republic Steel Corp., R. J. Wysor, vice-pres.-genl. mgr., Republic Bldg., Cleveland, improvements to tin mills and open hearths, by direct labor and buys materials from subsidiary companies. $200,000. C. A. Thayer, Republic Bldg., Cleveland ch. engr.

O., Youngstown — TUBE MILL — Republic Steel Corp., R. J. Wysor, vice-pres.-genl. mgr., Republic Bldg., Cleveland, improvements to tube mill coke plant, open hearths and transportation facilities, by direct labor and buys materials from subsidiary companies. $200,000. C. A. Thayer, Republic Bldg., Cleveland ch. engr.

Pa., Llyswen (Altoona, P. O.)—PLANT—Brumbaugh Body Co., C. Brumbaugh, pres. and mgr., 3031 6th Ave., Altoona, rehabilitation and installation of new equipment in buildings at 600 Logan Ave., separate contracts awarded. To exceed $37,000. Noted Feb. 6, C. D.—Feb. 13, E. N.-R.

Pa., Washington — MILL — Washington Tin Plate Co., replacing old frame building with 100x164 ft., 50 ft. high corrugated iron and structural steel building, to Washington Eng. & Constr. Co., Oakland and Pennsylvania Aves.; steel work, to Guilbert Steel Co., 1716 Youghiogheny Ave., Pittsburgh. Private plans.

Tenn., Niota—HOSIERY MILLS—Niota Mills, W. Foster and H. A. Collins, in charge, hosiery mills, separate contracts. $37,000 with equipment.

Tex., Port Arthur—BULK STORAGE PLANT—Gulf Oil Co., Port Arthur, bulk storage plant, separate contracts awarded: structural steel towers for tanks, to Petroleum Iron Wks. Co. of Texas, North Rice St., Houston. Est. exceeds $50,000.

Wash., Seattle—PLANT—Western Gear Wks., 417 9th Ave. S., plant addition, to J. T. Shatto, 806 Union St. Est. $40,000.

Ont., Goderich—POWER HOUSE—Goderich Salt Co. Ltd., equipment for power house, to Atwood Ltd., 660 Ste. Catherine St. W., Montreal, Que.; steel, to Dominion Bridge Co. Ltd., Lachine, Que. Total est. $72,000. C. S. Robertson, 33 North Michigan Ave., Chicago, Ill., engr.

Ont., Newmarket — PLANT — Davis Leather Co. Ltd., 23 Huron St. E., constructing 3 story, 80x46 ft., brick, steel addition to plant, plain found., Huron St., to Richardson Constr. Co. Ltd., 10 Adelaide St. E., Toronto. Est. $37,000. Noted Mar. 5, C. D.—Mar. 12, E. N.-R.

★ **Alta., Edmonton**—PLANT—Canada Packers Ltd., constructing complete packing plant, to Bird Constr. Co. Ltd., Moose Jaw, Sask. $1,000,000. Considerable equipment will also be purchased.

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For official proposal advertising see Searchlight Section

†*Federal Government*